

# REPORT

## THE COMMISSIONERS

APPOINTED TO ENQUIRE RESPECTING THE

## DRAINAGE OF THE DISTRICT TRAVERSED

BY THE

## RIVER BARROW AND ITS TRIBUTARIES,

TOGETHER WITH

## MINUTES OF EVIDENCE AND APPENDIX.

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Presented to both Houses of Parliament by Command of Her Majesty.

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1886.

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WARRANT appointing COMMISSIONERS to INQUIRE respecting the DRAINAGE of the DISTRICT traversed by the RIVER BARROW and its tributaries.

By the Lord Lieutenant-General and General Governor of Ireland.

SPENCER.

WHEREAS We have deemed it expedient that a Commission should forthwith issue to inquire respecting the Drainage of the District traversed by the River Barrow and its tributaries, and to report to us on the following matters, viz.:

I. The extent and present value of the lands injured by the floods of the Barrow and its tributaries, and the probable increase in the value of those lands, if relieved from the injurious effects of floods.

II. The best means, practicable, for confining the flood waters to the channel of the river, and thereby removing the injurious effects of the floods.

III. The cost at which such measures could be carried out.

IV. Whether the works could be profitably undertaken by the proprietors of the flooded lands, under the provisions of the Drainage Acts.

V. Whether the works for the relief of the lands flooded by the Barrow and its tributaries should be carried out as one project—or whether the river Barrow itself should be first separately dealt with, and the drainage of the tributaries left to be subsequently carried out, under the provisions of the Drainage Acts.

VI. How the funds necessary for the works should be provided.

VII. If the funds should be provided by a loan of public money, whether, in consideration of sanitary or other benefits to be derived from the drainage, the towns situated on the river, or the district at large, independent of the lands directly benefited should bear any portion of the charge in repayment of the loan.

VIII. Whether the works could in any way injuriously affect the Barrow Navigation or the lands below the down stream limits of the work.

Now We, JOHN POTTS, EARL SPENCER, Lord Lieutenant-General and General Governor of Ireland, do hereby nominate, constitute, and appoint you—

BERNARD EDWARD BARNAST, Baron Castletown, of Upper Ossory.

The Right Honorable HENRY BRUN.

Colonel Sir JOHN M'KENLIE, K.C.B.

Colonel HENRY DANIEL CARMON.

J. A. CASSIDY, Esquire.

HENRY SMITH, Esquire, and

RICHARD HARRISON, Esquire, C.E.,

to be Commissioners for the purpose of the said inquiry.

And for the better enabling you to make the said inquiries, We do by these presents authorize and empower you, or any three or more of you, to call before you, or any three or more of you, such persons as you may judge necessary, by whom you may be the better informed of the matters herein submitted for your consideration, and every matter connected therewith, and to inquire of and concerning the premises by all lawful ways and means whatsoever, and also to call for and examine all such books, documents, papers or records, as you shall judge likely to afford you the fullest information, and to inquire of and concerning the premises by all lawful ways and means whatsoever.

And We do further by these presents authorize and empower you, or any three or more of you, to visit and personally inspect, such places as you may deem expedient for the more effectual carrying out of the purposes aforesaid.

And We do further require you, or any three or more of you, with as little delay as possible, to report to us upon the matters referred to you as aforesaid, and also to certify to us from time to time your several proceedings in respect to the matters aforesaid as it may seem expedient for you so to do.

And we further order and direct that this our Commission shall continue in full force and virtue, and that you our said Commissioners, or any three or more of you, shall and may, from time to time, proceed in the direction thereof, and of every matter and thing therein contained, although the same be not continued from time to time by adjournment.

And for the purpose of aiding you in such matters, We hereby appoint JAMES PENNY, Esq., C.E., to be the Secretary to the Commission.

Given at Her Majesty's Castle of Dublin, this 30th day of March, 1885.

By His Excellency's Commands,

(Signed,)

W. S. B. KAYE.

Chief Secretary's Office,  
Dublin Castle, 16th April, 1885.

Sir,

With reference to your appointment as Secretary to the Barrow Drainage Commission, I am directed by the Lord Lieutenant to request that you will inform the Commissioners that it is His Excellency's wish that paragraph 8 of the instructions embodied in their Warrant of appointment, may be held to authorize them to inquire amongst other matters, whether the property invested in Mills on the river could be injuriously affected by the works of drainage.

I am, at the same time, to request that you will be so good as to state whether the Commissioners have yet entered upon their inquiry, and how soon they propose holding their first local personal inquiry into the matter.

I am,

Sir,

Your obedient servant,

(Signed,) R. G. C. HAMILTON.

James Penny, Esq.,  
Office of Works, Dublin.

# THE BARROW DRAINAGE COMMISSION.

## REPORT,

TO HIS EXCELLENCY JOHN CAMPBELL GORDON EARL OF ABERDEEN.

LORD LIEUTENANT-GENERAL AND GENERAL GOVERNOR OF IRELAND.

MAY IT PLEASE YOUR EXCELLENCY,

We the Commissioners appointed under the Warrant of your Excellency's predecessor, Earl Spencer, K.C., directing us to make inquiry "respecting the drainage of the district traversed by the river Barrow, &c.," have now the honour to lay before your Excellency the following Report of the proceedings taken by us in pursuance of our instructions, the facts we have ascertained, and the opinion we have formed with respect to the several points to which our attention is directed, and in conclusion to offer such recommendations as the circumstances of the case seem to us to warrant.

As a first step in our proceedings we considered it necessary that we should be furnished with a copy of the general map of the district, showing the course of the main river and its several tributaries, and the lands injured by the floods, to which it is periodically subject, which we were aware had, by directions of the Government, been prepared by the Board of Works, and also with a copy of the Report of the Board's engineer, with regard to the works necessary to give a free discharge to the flood waters, and consequent relief to injured lands, together with an estimate of the cost of those works, which had also been directed to be prepared.

It was felt to be equally necessary that we should be supplied with a copy of the valuation in detail of the benefit which would be probably derived from the now injured lands being secured against future liability to being flooded in the event of the works of improvement being carried out, which we were also aware had been made.

For these maps and documents we accordingly made application to the Board of Works, and having been furnished with them proceeded to enter on our inquiry, holding our first meeting in Dublin on the 22nd June.

At that meeting we received from Mr. FitzGerald (the valuator employed by the Board of Works, to survey and value the injured lands of the district with reference to their contemplated improvement by drainage), an explanation of the principles on which he had based his valuation, and also in regard to details and the extent to which the results he had arrived at might be relied on.

We also received from Dr. F. X. MacCabe, formerly Medical Inspector under the Local Government Board, a statement of his views—the result of his experience—in regard to the baneful effects to the public health, resulting from prolonged and widespread floods, in districts subject to such contingencies, and the malarious exhalations arising on their subsidence, and on the benefits which must follow from the flooding and saturation being removed by drainage works.

Further meetings were also held on the 24th and 25th of the same month, at which Mr. Manning, Chief Engineer to the Board of Works, was examined in regard to the general character of the Barrow District, the extent and duration of the flooding to which it is subject, and the nature and sufficiency of the works designed by him for affording relief, and the cost at which he estimated these works could be carried out.

These inquiries in Dublin were followed up by holding meetings within the limits of the district, viz., at Philipstown, King's County, on the 8th July; at Mountmellick,

Minutes of  
Evidence,  
sepp. 9, 10,  
12, 13, 14,  
15, 16, 17,  
18, 19, 20,  
21, 22, 23,  
and Mr.  
Manning's  
Report in  
Appendix.

Queen's County, on the 10th July; at Portarlington, King's County, on the 17th July; at Monasterevan, County Kildare, on the 21st July, and at Athy on the 28th July, with the object of ascertaining the views and opinions of the persons locally interested, and who were invited by public advertisement to come forward, notice at the same time of copies of the plans, reports, and valuation schedules being deposited in convenient places for their inspection and information.

A further meeting was also held at Carlow on the 29th July, for the purpose of affording an opportunity to the Barrow Navigation Company, and the Mill-owners and others interested in the regimen of the river below Athy (the point at which it is proposed the works of the Drainage District should terminate), of stating their objections (of which they had given notice) and explaining the grounds on which they apprehended injurious consequences to their several interests if the works as proposed were carried out.

The evidence given in regard to this important question will be found in the Minutes of Evidence.

The general character of the drainage area, or catchment basin of the District traversed by the River Barrow, to which our inquiry is practically, so far as drainage is concerned, confined, is generally flat, the exception being on the western side, where the main river has its source in the Slieve Bloom Mountains, which attain a considerable elevation.

Regarded as a separate drainage district, it must be considered one of the most important in Ireland, whether in respect of its position and attendant circumstances, or the extent of its drainage area and of the lands flooded and injured.

With reference to the important consideration of the public health involved in the projected measure, there can be no doubt of the great benefit which would accrue, not only within the area of the lands immediately affected, but to a wide extent beyond, embracing, perhaps, nearly the whole drainage district.

The evidence of Dr. MacCabe, as well as of the local medical practitioners, sanitary authorities, and other observant persons, conclusively testify to the baneful consequences resulting, both in town and country, from the long-continued floods and the malarious vapours arising on their subsidence, and during the drying up of the saturated lands.

With regard to the apprehended effect of the drainage works in bringing down such an increased volume of water in such rainfalls as now produce floods, and in causing a diminished flow in dry weather, as would be prejudicial to the Barrow navigation, and also to the milling and other interests, on the River below Athy, we beg to refer to the evidence—professional and non-professional—brought forward on behalf of the parties concerned, and to the statement made by Mr. Manning, the opinion we have arrived at being given in our hereinafter observations in reply to the special reference to us on this point.

The important consideration of the feelings with which the proposed drainage is regarded by the different classes of persons or interests affected, now only remains to be adverted to.

Both the owners and occupiers of the flooded and injured lands, whatever may be the objections they have, or may put forward in their individual cases, may be said to be nearly unanimous in its favour, though it is urged on behalf of the former, the owners, while the responsibility with regard to the drainage charges, as well as the maintenance of the works, would under the Drainage Acts now in force, fall entirely on them, and all risk of loss be theirs, the latter in the position they now hold in regard to their occupancy of the lands would enjoy the entire benefit to be derived whatever it might be, both present and prospective, and therefore it has in several instances been declared, and doubtless would be so in many others, that they, the owners, would not, under such circumstances, be disposed to give their assent to the drainage being proceeded with.

The inhabitants of the district generally, and more especially the residents in the towns, appear, as far as we had an opportunity of judging, to be strongly in favour of the measure.

The Barrow Navigation Company also and the millers, and others holding valuable interests on the River below Athy, while seeking to protect their property from the injury which they apprehend may result from the drainage operations, yet fully acknowledge the public advantage which the drainage would confer, and beyond guarding themselves against possible loss, desire to offer no opposition to the undertaking.

We now beg to submit the conclusions at which we have arrived in the form of answer to the questions contained in the Warrant of His Excellency the Lord Lieutenant.

See Minutes  
of Evi-  
dence, pp.  
73, 80, 81,  
82, 83, 84,  
85, 86, 87,  
88, 89, 90,  
91, 92, 93,  
94, 95, 96,  
97, 98, 99,  
107, 108,  
109, 110,  
111, 115,  
113, 114,  
115, 116,  
117, 118,  
and 119.  
The general  
character  
of the  
district.

See Minutes  
of Evidence,  
pp. 70-101.

## QUESTION I.

The Reports and Schedules furnished by Mr. Fitzgerald, acting under the instructions of the Board of Works, may be accepted as sufficiently accurate, as showing the area of the lands and the present and prospective value thereof. The area of the lands injured is approximately 45,552a. 1r. 7p.

The probable increase per annum in the value of those lands if relieved from the injurious effects of the floods may be estimated at £9,852 17s. 9d.

Objections were raised to the reports on the area and valuation in several instances. These objections were investigated, and a full tabular statement giving all details is annexed in the appendix.

## QUESTION II.

The Commissioners are of opinion that the only effectual way in which this can be carried out is by a general improvement of the outfall channels, which can be done by widening, deepening, and enlarging the bed of the rivers, or making new watercourses where necessary and advisable.

## QUESTION III.

The cost of the work if carried out as an entire scheme can with safety be based on Mr. Manning's estimate, as revised by Mr. Hassard, and would amount to £550,000.

## QUESTION IV.

The cost of the works being so largely in excess of the probable improved value of the lands, the Commissioners are of opinion that it would be impossible for the proprietors of the flooded area to undertake the project as a whole without great pecuniary loss, and that it could not be profitably carried out by them under the existing Drainage Acts.

Having, therefore, regard to the peculiar circumstances of the case, and the diverse interests involved, agricultural, commercial, sanitary, both rural and urban, and irrespective even of the matter of cost, it is considered by the Commissioners that the project could not be adequately undertaken and carried out without a special Act of Parliament, embodying such selections of the Drainage Acts and other Acts as may be necessary.

## QUESTION V.

On this question alone the opinions of the Commissioners are really divergent, five of them considering that the improvement of the channels of the Great and Little Barrow Rivers, a portion of the Figlie River from Monasterevan to the junction with it of the Quahina River, should be undertaken as one project, while the tributaries could be dealt with subsequently, and independently. On the other hand, two of the Commissioners are of opinion that the work should be done as a whole, under an authority or Board of Management, composed of persons in the district, representing the various interests; and with reference to the Board of Works as a controlling body, as is now the case in Arterial Drainage projects carried out under the Drainage Acts.

Under these circumstances the Commissioners consider that the best method of dealing with the question at issue would be to recommend the introduction of a special Act of Parliament, dealing with the drainage scheme as proposed by Mr. Manning, *c.s.*, as a whole, but extended in and about Athy, in accordance with the suggestions made by Mr. Commissioner Hassard, *c.s.*, in his report; providing for the immediate execution of the works recommended by the majority of the Commissioners; and that the Act should contain provisions enabling those proprietors interested in the drainage of the tributaries at their own option to deal with those tributaries, either as immediate parts of the whole or as subsequent and subsidiary parts of the entire scheme.

That a general Board of Management should be created to supervise and control the works with reference to the Board of Works as a controlling body.

That this Board be composed of those interested in the districts affected. That in the event of any tributary district not utilising the new outfall which will be given by the works on the main rivers, that such district should not be considered to be contributory to, or subject to the management of the central Board.

That any tributary district desirous to co-operate in the main scheme of works should be entitled to take such course, and thereby become immediately contributory and subject to the central Board of Management.

That should any tributary district prefer to undertake and carry out the drainage works in that district, under the provisions of the Drainage Acts, and subsequent to the main drainage works, it shall be entitled to do so, but from the date of the commencement of such works, and the utilization of the main drainage for its outfall, such district must become contributory to such general rates as may be hereinafter specified and arranged, and subject to the Board of Management in all matters having reference to the utilization of the main drainage works by that particular tributary.

#### QUESTIONS VI. and VII.

These two questions may be answered simultaneously, and the Commissioners are of opinion that a grant of public money is necessary to enable any efficient scheme of drainage to be carried out. This should be in the nature partly of a loan, and partly of a subsidy or gift from the public purse. They have arrived at this conclusion, for the following reasons :

1st. The granting of such aid would not be without precedent as instanced in connexion with the improvement of the River Shannon, and also in many cases of Drainage Districts, carried out under the Act of 1842 (5 and 6 Vic., cap. 89), and subsequent amending Acts, though in these cases the grant took the form of a remission, after the completion of the works, on special inquiry by the Treasury under the authority of Parliament. It may be observed, however, that these remissions cannot be regarded as entailing a loss to the public, for it cannot be doubted that the drainage of these Districts conferred a great public benefit.

2nd. Whatever may be the improvement rates capable of being levied off the whole district, their aggregate amount capitalized, would fall so far short of the necessary expenditure as to render it impossible to proceed with the undertaking, unless the loan were assisted by a special subsidy of public money.

3rd. The unsanitary condition of the flooded district, and the towns situated in it, as disclosed by the evidence tendered to the Commissioners, justifies, in their opinion a legitimate expenditure of public money with a view of ameliorating this state of things.

4th. The national importance and the scale of these greater schemes of Drainage, place them outside and above the ordinary scope and means of Drainage Boards.

With reference to the repayments of the Loans on public advances and other rates, they recommend that the lands directly benefited by being relieved from the effects of floods should contribute an annual rate as fixed in the Drainage Schedule, or as otherwise determined for such number of years as may be named in the Act to pay off principal and interest.

One witness, to whose authority the Commissioners attach great weight, recommended that part of the expense of carrying out the scheme should be borne by a general rate levied on all the lands within the district comprised in the watershed and contributing water to the outfall. The question, however, did not appear to have attracted the attention of those generally interested, and little other evidence was given upon it. There is much to be said in support of this proposition, and it has met with favour in the Report of the Select Committee of the House of Lords on Conservancy Boards, dated 24th July, 1877; but it has never been adopted by the Legislature, and the introduction of this new principle into Drainage Legislation would require much consideration.

In the course of their inquiry the Commissioners found no disinclination on the part of the authorities or people in the towns visited to a special rate being levied on the towns, to meet such proportion of the cost of the undertaking as may be considered a fair charge for the improvement in their sanitary condition which they would undoubtedly derive, and which is (as has been stated above) very bad indeed.

They therefore recommend such special tax being allocated to the towns as supplementary to the ordinary drainage rate.

#### QUESTION VIII.

The general evidence went to show that some additional flooding of lands and property on the Lower Barrow might be anticipated from the increased volume of water sent down from the upper district consequent on the proposed works, but this injury if found to occur, can be obviated by removing existing obstructions and providing additional waterway where necessary.

It may however be requisite to take down and rebuild some of the public road bridges over the river, and in such cases, a portion at least of the cost, should be contributed by the adjoining counties.

The Commissioners are further of opinion, that some clauses should be introduced into the special Act to ensure for the future that such new works should be efficiently maintained, and that the channels of the Lower Barrow should be kept properly open and free from obstructions by the Barrow Navigation Company.

The Commissioners are also of opinion that the interests of the Barrow Navigation Company will not be appreciably affected by the construction of the proposed new works of arterial drainage.

CASTLETOWN,  
OF UPPER OUSORT.  
HENRY BRUEN.  
J. G. M'KERLIE.  
H. D. CARDEN.  
J. A. CASSIDY.  
HUMPHRY SMITH.  
RICHARD HASSARD.

JAMES S. PENNY, *Secretary*.  
12th February, 1886.

#### MEMORANDUM ON QUESTION VIII.

The Commissioners found great difficulty in dealing with this question, the specialist evidence placed before them being somewhat divergent and conflicting. The other Commissioners were, however, much aided in their deductions by Mr. Commissioner Hassard, and it is mainly on his most valuable opinion and carefully considered reports and advice that their answers to this particular question are formulated.

CASTLETOWN,  
OF UPPER OUSORT.

## DISSENT.

I regret to be unable to concur with the majority of the members of the Commissioners in regard to the manner in which it is deemed expedient that the Drainage of the Barrow District should be carried out as more particularly referred to in Question V.

The reasons for my dissent are these, viz. :—

1st. In confining the works to be undertaken—as a determinate measure—to the Main River, as proposed, and under which arrangement, in order to provide for the opening up of the tributaries, the works must be carried out on the full scale for the whole district, the great part of the cost (about two-thirds) for the entire drainage scheme must be incurred, while probably a still greater proportion of the deficiency to be made good from extraneous sources, in consequence of the comparatively small amount to be charged against the improvement of the lands, would also be an attendant result.

2nd. In leaving it optional with those interested in the tributaries to undertake the works necessary for the relief and improvement of the lands on those tributaries, either at some future period as separate districts, or to assent to their being undertaken in connexion with the Main River operations, it would be by no means certain that they would be undertaken at all.

This would more especially be the case where postponement is determined on, as in the majority of cases, the cost would probably be found to be so much in excess of the value of the benefit to be derived (from the improvement of the lands) as to render it highly improbable that the measures would be proceeded with unless aid were forthcoming from outside sources.

3rd. In operating on the tributaries as separate districts under separate, and, in a great measure—as must needs be—Independent Boards, serious complications and difficulties could hardly fail to arise, both in regard to the general management and in affecting the established regimen (by deposition of silt, &c.) of the Main River channel assumed to have been previously completed.

4th. It being apparent that without the aid of large contributions, both from the drainage area in its entirety, probably, and from the public at large, it is hopeless to expect that the project can be proceeded with, it is to be apprehended that there would be an indisposition on the part of the inhabitants of the district to assent to be taxed for an incomplete measure, and one which would leave, to a great extent, the evils towards the removal of which they would probably be willing to contribute still unremedied.

5th. It is also a matter for consideration that the drainage of the district as a whole could, with hardly a doubt, be carried out at less cost, and with more satisfactory results, than if sub-divided and undertaken piecemeal at future periods, probably remote, and under different authorities.

My opinion is that in the general interests, local as well as public, it is most desirable that the drainage of the district should be carried out as one complete and comprehensive measure.

I feel it my duty also further to observe, with reference to question of looking for a portion of the excess in the cost of the undertaking over the amount which can be charged against the lands directly deriving benefit, from the adjacent district lying within the drainage basin, that having regard to the unquestionable benefit which would result to the greater part of that district from the drainage operations, the improvement in its general condition; its drier and warmer atmosphere and the consequent earlier ripening and more secure gathering of the crops; the increased means of employment to the labouring population, their more healthful condition, and consequent diminution in the poor rates; and looking also to the circumstance that nearly all the expenditure on the works would be within the district, it would seem to be only just and reasonable that the providing of the funds should to some moderate extent be required to be contributed in aid of the public grant, if made, from the district so largely benefiting.

J. G. M'KERLIE.

13th February, 1886.

# DISSENT WITH RESPECT TO QUESTION No. 5.

I reluctantly differ from the opinion arrived at by the majority of the Commissioners, for the following reasons:—

Independently of the advantage to the locality, in a sanitary point of view, of having the undertaking carried out simultaneously, and as a whole, rather than piecemeal, it must be borne in mind that the cost of opening up and improving the channels of almost all of the tributaries, although not nearly so large in proportion to the acreage relieved from flood by the construction of the main outfall, is still so great as to render it impracticable that these minor works could be undertaken by the proprietors, unless largely assisted by public money, as in the case of the Main Rivers.

Take, for instance, the Stradbally, Timogue, and Kyle Rivers, tributaries to the Great Barrow. The joint area relieved from the injurious effects of flood is 1,690 acres; the cost of the necessary works, according to Mr. Manning's estimate, being £12,960, and adding 15 per cent. to this to assimilate it to the revised estimate adopted by the Commissioners, gives £14,904, or on an average of about £8 16s. 4½d. per acre. Mr. Fitzgerald's estimate of improved value being respectively 4s. and 4s. 4d. per acre.

The Triogue and Owenass streams, tributary to the Little Barrow, would have a joint acreage relieved from flood of 2,406 acres; Mr. Manning's estimate for the necessary works being £27,470, adding 15 per cent. as before, gives £31,590, or an average of £13 2s. 7d. per acre; Mr. Fitzgerald's estimate of improved value averaging about 5s. 1d. per acre.

The Figile River would have 5,738 acres relieved from flood at a cost of £56,098, or with 15 per cent. added, of £64,500, or £11 4s. 9d. per acre. Mr. Fitzgerald's estimate of improved value being 5s. 10d. per acre.

The Cushina, Slate, and Philipstown Rivers, tributary to the Figile, would have a joint area of 6,491 acres relieved from flood at a cost of £38,214, adding as before 15 per cent., gives £43,945 10s., or an average of £6 15s. 5d. per acre. Mr. Fitzgerald's estimate of improved value averaging about 4s. 5d. per acre.

Taking the case of the tributaries most favourably circumstanced, we have the Finnery, Killenny, and Ballybrittas Rivers, tributary to the Great Barrow. The area relieved from flood would here be 9,663 acres, at a cost, adding 15 per cent. to Mr. Manning's estimate, of £37,743, or an average of £3 18s. 1½d. Mr. Fitzgerald's estimate of improved value being about 3s. 9d. per acre.

On the Great and Little Barrow Rivers the joint area relieved from flood would be 19,653 acres, and adding to this about 3,000 acres, which would be unwatered by constructing an outfall from Monasterevan to the junction, with the Figile of the Slate and Cushina Rivers, as recommended by the Commissioners, gives a total of 22,653 acres on the Main Rivers, leaving 22,968 acres as situated on the tributaries.

Of this last named area, as will be seen, the only portion of the works which could, with any prospect of repayment, be undertaken by the proprietors, is the 9,663 acres, situate on the Finnery, Killenny, and Ballybrittas Rivers, leaving 13,325 acres, the relief of which cannot be effected without State aid—the probability indeed, almost amounting to certainty, being that no works whatever would be undertaken by the proprietors on the tributaries even if the works of the main outfall were completed.

Under these circumstances the undertaking would, of course, be of comparatively little public benefit, and would present the unusual feature of one part of the district receiving State aid, withheld from other portions equally in need of it.

RICHARD HASSARD.

13th February, 1886.



## MEETINGS OF THE COMMISSIONERS.

## FIRST DAY.—THURSDAY, APRIL 23rd, 1865.

At a meeting of the Commissioners held this day at their office, 14, Castle-street—

*Present*.—Lord CASTLETOWN (Chairman), the Right Honorable HENRY BRUCE, Colonel Sir JOHN M'KENNIE, K.C.B., Colonel H. D. CANNON, Mr. J. A. CANNON, Mr. HUMPHRY SMITH, and Mr. RICHARD HARRARD, C.E.; with Mr. JAMES S. PENNY, C.E., Secretary.

The Lord Lieutenant's warrant was read. Arrangements were made as to the mode of procedure. The meeting adjourned until supplied with the Valuation Survey and Engineer's Report.

## SECOND DAY.—MONDAY, JUNE 22nd, 1865.

*Present*.—Lord CASTLETOWN (Chairman), the Right Honorable HENRY BRUCE, Colonel Sir JOHN M'KENNIE, K.C.B., Mr. J. A. CANNON, and Mr. HUMPHRY SMITH; with Mr. JAMES S. PENNY, C.E., Secretary.

The Right Honorable Henry Bruce was unanimously elected Vice-Chairman. Evidence taken as to the surveyed area and annual valuation of the injured lands; and their probable increase in value when relieved from the injurious effects of floods. Also as to the general sanitary state of the district.

## THIRD DAY.—WEDNESDAY, JUNE 24th, 1865.

*Present*.—The Right Honorable HENRY BRUCE (Vice-Chairman), Colonel Sir JOHN M'KENNIE, K.C.B., Mr. J. A. CANNON, Mr. HUMPHRY SMITH; with Mr. JAMES S. PENNY, C.E., Secretary.

Evidence taken as to the works designed for confining the flood waters to the channel of the river, for the purpose of removing the effects of injurious floods.

## FOURTH DAY.—THURSDAY, JUNE 25th, 1865.

*Present*.—The Right Honorable HENRY BRUCE (Vice-Chairman), Colonel Sir JOHN M'KENNIE, K.C.B., Mr. J. A. CANNON, Mr. HUMPHRY SMITH, and Mr. RICHARD HARRARD, C.E.; with Mr. JAMES S. PENNY, C.E., Secretary.

Evidence taken on the same subject as at previous meeting.

## FIFTH DAY.—WEDNESDAY, JULY 8th, 1865.

At a meeting of the Commission held this day at the Court House, Philipstown—

*Present*.—The Right Honorable HENRY BRUCE (Vice-Chairman), Colonel Sir JOHN M'KENNIE, K.C.B., Mr. J. A. CANNON, Mr. HUMPHRY SMITH, and Mr. RICHARD HARRARD, C.E.; with Mr. JAMES S. PENNY, C.E., Secretary.

Evidence taken as to the valuation of the injured lands.

## SIXTH DAY.—WEDNESDAY, JULY 10th, 1865.

At a meeting of the Commission held this day at the Court House, Mountbellek—

*Present*.—The Right Honorable HENRY BRUCE (Vice-Chairman), Colonel Sir JOHN M'KENNIE, K.C.B., Colonel H. D. CANNON, Mr. J. A. CANNON, Mr. HUMPHRY SMITH, and Mr. RICHARD HARRARD, C.E.; with Mr. JAMES S. PENNY, C.E., Secretary.

Evidence taken to objections made as to the valuation of the injured lands, and also to the sanitary state of the town and the surrounding district.

## SEVENTH DAY.—FRIDAY, JULY 17th, 1865.

At a meeting of the Commission held this day at the Court House, Portliffington—

*Present*.—Lord CASTLETOWN (Chairman), the Right Honorable HENRY BRUCE (Vice-Chairman), Colonel Sir JOHN M'KENNIE, K.C.B., Mr. J. A. CANNON, Mr. HUMPHRY SMITH, and Mr. RICHARD HARRARD, C.E.; with Mr. JAMES S. PENNY, C.E., Secretary.

Evidence taken to objections made to the valuation of the injured lands; also to the sanitary state of the town and the surrounding district.

## THE BARROW DRAINAGE COMMISSION.

EIGHTH DAY.—TUESDAY, JULY 11<sup>th</sup>, 1885.

At a meeting of the Commission held this day at Monasteren—

*Present* :—The Right Honourable HENRY BRUCE (Vice-Chairman), Colonel Sir JOHN McKENLIE, K.C.B., Colonel H. D. CARRIS, Mr. J. A. CASSIDY, and Mr. RICHARD HARRARD, C.E.; with Mr. JAMES S. PENNY, C.E., Secretary.

Evidence taken to objections made to the valuation of the injured lands. Also as to the sanitary state of the town, and Portliffington, and the surrounding districts.

NINTH DAY.—TUESDAY, JULY 23<sup>rd</sup>, 1885.

At a meeting held this day at the Court House, Athy—

*Present* :—Lord CASTLETOWN (Chairman); the Right Honourable HENRY BRUCE, (Vice-Chairman); Colonel Sir JOHN McKENLIE, K.C.B.; Colonel H. D. CARRIS, Mr. J. A. CASSIDY, Mr. HUMPHRY SMITH, and Mr. RICHARD HARRARD, C.E., with Mr. JAMES S. PENNY, C.E., Secretary.

Evidence taken to objections made as to the valuation of the injured lands as well as to the sanitary state of the town and the surrounding district. Also as to the anticipated effect below the down-stream limits of the proposed works, which terminate a short distance below Athy, to the Barrow navigation.

TENTH DAY.—WEDNESDAY, JULY 29<sup>th</sup>, 1885.

At a meeting of the Commission held this day at the Court House, Carlow—

*Present* :—The Right Honourable HENRY BRUCE, (Vice-Chairman); Colonel Sir JOHN McKENLIE, K.C.B.; Mr. J. A. CASSIDY, Mr. HUMPHRY SMITH, and Mr. RICHARD HARRARD, C.E., with Mr. JAMES S. PENNY, C.E., Secretary.

Evidence taken as to the anticipated injurious effect of the proposed works to the Barrow Navigation, Milling, and other interests.

ELEVENTH DAY.—FRIDAY, AUGUST 7<sup>th</sup>, 1885.

At a meeting of the Commissioners held this day at their offices, 14, Castle-street—

*Present* :—Lord CASTLETOWN (Chairman); the Right Honourable HENRY BRUCE, (Vice-Chairman); Colonel Sir JOHN McKENLIE, K.C.B., Colonel H. D. CARRIS, Mr. J. A. CASSIDY, and Mr. RICHARD HARRARD, C.E., with Mr. JAMES S. PENNY, C.E., Secretary.

Evidence taken to objections made by persons interested who could not attend at the local centres, as to the valuation of the injured lands. Evidence also taken as to the anticipated injurious effect of the proposed works to the milling and other interests below the limits of the proposed works.

TWELFTH DAY.—WEDNESDAY, OCTOBER 28<sup>th</sup>, 1885.

*Present* :—Lord CASTLETOWN (Chairman); Colonel Sir JOHN McKENLIE, K.C.B.; Colonel H. D. CARRIS, Mr. J. A. CASSIDY, and Mr. RICHARD HARRARD, C.E., with Mr. JAMES S. PENNY, C.E., Secretary.

The consideration of the report of Mr. Commissioners HARRARD, C.E., on an examination of the river Barrow within the limits of the works proposed for relieving the lands from injurious floods, and the cost thereof, and also on the state, below the limits of the proposed works, of the river Barrow, in regard to navigation, milling, and other interests.

THIRTEENTH DAY.—TUESDAY, NOVEMBER 17<sup>th</sup>, 1885.

*Present* :—Lord CASTLETOWN (Chairman), the Right Honourable HENRY BRUCE, (Vice-Chairman); Colonel Sir JOHN McKENLIE, K.C.B., Colonel H. D. CARRIS, Mr. J. A. CASSIDY, Mr. HUMPHRY SMITH, and Mr. R. HARRARD, C.E., with Mr. JAMES S. PENNY, C.E., Secretary.

Evidence taken on objection made on behalf of the Barrow Drainage Committee to the proposed works

FOURTEENTH DAY.—FRIDAY, FEBRUARY 6<sup>th</sup>, 1886.

*Present* :—Lord CASTLETOWN (Chairman); the Right Honourable HENRY BRUCE (Vice-Chairman); Colonel Sir JOHN McKENLIE, K.C.B., Colonel H. D. CARRIS, Mr. J. A. CASSIDY, Mr. HUMPHRY SMITH, and Mr. R. HARRARD, C.E., with Mr. JAMES S. PENNY, C.E., Secretary.

The Commissioners proceeded with the consideration of a draft Report prepared by the Chairman, and made some amendments.

FIFTEENTH DAY.—FEBRUARY 12<sup>th</sup>, 1886.

*Present* :—Lord CASTLETOWN (Chairman); the Right Honourable HENRY BRUCE (Vice-Chairman), Colonel Sir JOHN McKENLIE, K.C.B., Colonel H. D. CARRIS, Mr. J. A. CASSIDY, Mr. HUMPHRY SMITH, and Mr. R. HARRARD, C.E., with Mr. JAMES S. PENNY, C.E., Secretary.

The Report, as it now stands, was finally adopted, Colonel Sir JOHN McKENLIE and Mr. R. HARRARD indicating their intention to dissent from the recommendations made therein, with respect to the answer to Question V., that the improvement of the channels of the Great and Little Barrow Rivers, a portion of the Fyffe River, from Monasteren to the junction with it of the Cuskina River, should be undertaken as one project—while the tributaries could be dealt with subsequently.

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# THE BARROW DRAINAGE COMMISSION.

MONDAY, 22ND JUNE, 1885.

June 22, 1885.

The Commission met at La Touche's Bank premises (the offices of the Commission), Castle-street, Dublin, on this date at 12.30 P.M.

PRESENT:—Lord CASTLETOWN, Chairman (presiding), Right Hon. HENRY BRUCE, Vice-Chairman; Sir JOHN M'KENLIE, K.C.B., Mr. J. A. CASSIDY, and Mr. HUMPHREY SMITH.

Mr. PRIST, Secretary, was in attendance.

Mr. Thomas FitzGerald, C.E., examined.

Mr. Thomas FitzGerald, C.E.

1. Lord CASTLETOWN.—We will ask you kindly, Mr. FitzGerald, in the first instance to give us an account of how the valuations you have arrived at with regard to the Barrow drainage district have been made out, and your opinion generally on the subject. We want to get roughly an idea of how the estimate has been made out. We can deal with the different details as we come to them afterwards.—Well, my lord, I went over this district shortly after the passing of the Act of 1863. In 1864 I went over the whole of the Barrow district from Athy to Portlough Bridge. There was a speculation got up to try and drain the Barrow under that Act, but it failed through want of sufficient contributions to pay the preliminary expenses I mention this to show that I was familiar with the entire district previous to being employed by the Board of Works to go over it this time. I commenced at Athy to make my examination at what is called the Duke's Weir, at the mill which is immediately above the bridge at Athy, and I worked the Barrow up, just the same way as I had done before, making Portlough Bridge my limit, and Clare Hill Bridge, three or four miles above Mountmellick, and that is too far to go, for you come into the mountain gravel district, which you cannot deal with at all.

2. Mr. Humphrey Smith.—There is a distinct above Portlough Bridge where an immense quantity of sand comes down, and the course of the Barrow is diverted, and you cannot improve it, for the next flood would drive it out of its course again. Is not that so?—That is at Tinslinch Bridge. Portlough Bridge is between Mountmellick and Portlough. I worked all the tributaries coming into the Barrow at both sides through that district, through all that distance—all the tributaries that come into the Barrow as far as I could find that they were injuring or flooding the lands.

3. Lord CASTLETOWN.—What tributaries were they. I only want to get a rough idea at the present moment, for we can go into detailed questions afterwards.—Well, the first in Kildare is the Finney river, which starts from near Dunlavin, and waters an immense district, falling into the Barrow about midway between Athy and Mountmellick. That is the principal tributary in Kildare, except in a small district below Rathangan, but the stream—the Slane river—is more or less a boundary between the King's County and Kildare.

4. Is that inside the Rathangan drainage district?—No, the Rathangan drainage district stops at the bridge, and this is from the bridge down to the Barrow. It is only for a short distance—all it gets into the Little Barrow. The tributaries in the King's County are, first, the Fiddle river. The examination of that commenced in the townland of Cusballing, Lord Downshire's property—you will find it on Ordnance Sheet 50 of the King's County—it runs in a westerly direction until it joins the Philipstown river at the

village of Cusballing. The Cusballing joins it at the south-eastern end of the townland of Cheerychase, Ordnance Map 27, and they are united until they drop into the Barrow.

5. Is that all the tributaries in the King's County?—That is all. There are several minor ones, but they have no names. They are more bog drains than rivers. They have no distinguishing names or rivulets.

6. Well, we come to the Queen's County next. Give the number of tributary rivers in the Queen's County?—There is the Triogue. I walked that from half a mile of Maryborough down to where it joins the Barrow at Stradally, half a mile below Mountmellick.

7. Wasn't there some drainage work done on that river once?—No, there were some little bits here and there.

8. Mr. Smith.—Did you forget the Owennass river which flows through Mountmellick; you did not mention it?—No. It flows into the river Barrow a mile and a half below Mountmellick, a short distance above Barnagh's bridge. I examined all that district.

9. Lord CASTLETOWN.—But the Owennass river flows through Mountmellick into the Barrow?—Yes.

10. And isn't it a distinct river, apart from the Barrow?—It is a distinct river, but it is affected by the Barrow. I had no sections of rivers with me when I made the examination. I had only to use my eyes.

11. But it is a distinct river?—It is.

12. Where does it rise?—Up in the slopes of the Slievebloom mountains, and part of it is very gravelly.

13. Where does it flow into the Barrow?—About a mile and a half below Mountmellick.

Mr. Bruce.—At the same point as the Triogue flows into it.

14. Mr. Smith.—Just near Mr. Warburton's place the Triogue falls in?—Yes. The Stradally river is the next—at the end of the Queen's county district, it flows through the village of Stradally into the Barrow.

15. Lord CASTLETOWN.—But that Stradally river goes into another drainage district?—I only commenced about a mile above Stradally.

16. Mr. Bruce.—About what part of the Barrow does it flow in?—At Portree, just near Lady Bellows's property. These are all the principal tributaries. On my first examination of the Barrow there was a larger district of drainage into the Barrow than now. I then examined the upper Rathangan district. There was also a large district going into the Barrow below Mountmellick but both these districts have been drained to the very great detriment of the country below them. The floods are greater than even they were before, the people are all complaining of it.

Mr. Smith.—The river down below not being opened sufficiently for the outlet.

June 21, 1881.

Mr. Thomas  
Flanagan, &c.

17. Mr. Brown.—That is to say, the discharge from those works coming down in the lower part of the Barrow produces injury?—Precisely.

18. Mr. Smith.—By reason of the Barrow not being opened below?—Yes; and those rivers not being opened into the Barrow. There is a remarkable instance on Lord Drogheda's property, I have seen on several occasions the lands in front of the Barrow flooded with three or four feet of water, while I could walk along its banks.

19. Lord Castletown.—Are these lands flooded by the upper drainage of Rathangan?—Precisely, and by the Charlemilla river.

20. Mr. Smith.—If the lower part were opened up it would remedy that?—It would in a great measure. The Barrow should be deepened.

21. What is now in contemplation would open down to Athy, and would let all that water away?—It would, in a great measure.

22. Lord Castletown.—Did you find there was any damage done by the back being too small to let all the water go down?—was the damage done below the neck?—The damage was done below that, and the people told me the floods were far and away larger within the last few years than ever they were before.

23. But the Rathangan district has been completely cleared from floods?—I believe so, and up in the Duke's district also.

24. And practically, there has been no back water from it?—No; I found that the channel of the river Barrow appeared to me to have got considerably narrower since my first inspection of the district, and the discharging power less. There were weeds on each side, and little islands springing up in the center. There does not appear to have been any person in charge, or care of, the river channel at all.

25. You mentioned just now that a great deal of silt was brought down from the upper course, which stream it was hardly worth going into?—Oh, that is at the top of the Barrow.

26. And you said that it is practically always silting up, and that there was no use in doing anything at all there?—I don't think there would be any use for you here no lead to improve.

27. Supposing that was left entirely untouched, would not a great deal of the silt be brought down from there into the lower grounds?—Of course, the floods used to flow off about twenty years ago much more rapidly than they do now, for river silt is growing at each side, and particularly below Monasterevan and a little above it, and the flow of the water is so slow, that aquatic plants are growing, and the soft mud is deposited and increasing every day around these plants, so that the river channel is becoming narrower. When I was there last I noticed that several islands have sprung up that I did not see before.

28. Did you hear any complaints amongst the people as to the grass having been damaged by the silt getting on to it, and eating it up?—Of course, I say that all the property along the Barrow has lost all its value since I first saw it.

Mr. Smith.—I know myself where grass has grown that no animal could eat.

29. The Witness.—Lord Drogheda's under-agent, who purchased the townland of Pollyperton in the Landed Estates Court, told me where he used to get 25 an acre for meadow, and last May twelve months when I was there, he could not get more than half-a-crown for some of it, it was left uncut.

Mr. Caird.—I had some myself, and when I went to look at it I found it so bad that I would not cut it.

30. The Witness.—Oh, several meadows are uncut. All the native grasses have died away, and there is nothing growing there but aquatic, bad coarse stuff. I found a general feeling amongst the people that they would not be satisfied with the drainage of the main river unless the tributaries were sunk. They said, "Unless you bring the drainage up to our doors it will be of no use to us." I think it right to tell that

to the Commissioners, because these people may be objecting to pay when any tax is put on.

31. Lord Castletown.—The general drainage of the tributaries, I suppose, would be just like ordinary drainage?—Like ordinary drainage. I don't see any difficulty whatever about the tributaries, because they generally run through soft marshy ground. Except at Portliffington, I did not discover any rock. There is limestone rock there which would have to be cut through, but it is only for a short distance. The greatest obstruction in regard to the Barrow is unquestionably the weir at Athy.

32. Mr. Brown.—You speak of the obstruction of a weir at Athy, is that a navigation weir?—No, a mill weir.

33. And would not the mischief done by that obstruction be intensified if those works you have been anticipating were completed?—Mr. Manning, the engineer, has some plan for relieving that weir. I drew his attention to it.

34. You gave evidence of the deterioration of some of the lands there owing to the increased sudden discharge of flood water upon them from the drainage of other districts?—Yes.

35. I suppose the same thing would take place about the lands of Athy and lower down the river?—I did not examine below Athy.

36. Well, about Athy?—Well no, there is not much damage below Athy, and the navigation commences below Athy. I confined myself to that weir. I did not go beyond it, but of course the same thing must apply. If you send down a greater body of water in quicker time you must make provision for it below.

37. Sir John McEwen.—Have you included all the flooded lands in the district?—Yes, as far as I could ascertain.

38. Did you include any portion of the bog lands?—Only one portion—that is the Red Bog between Monasterevan and Athy—and the reason I included that is that there is an immense district of country from which the people come—even from parts of the County Wicklow—to that bog. There is a great trade in turf there, but the people cannot cut down to the valuable turf in consequence of the bad drainage. That applies particularly to some of Lord Drogheda's bogs, which could not be cut down without draining them further. I put a very moderate value upon those, however—I only put 6d. per acre down for the present value, and 6d. for the improvable value.

39. But doesn't the same reasoning apply to other bogs?—No, for the same demand is not there. There are plenty of saturated bogs about which the people can use.

40. Then it is a question of demand altogether that you take into consideration?—Only the question of demand. They are practically of no use, these bogs, except there is a demand. The people come from a great many parts of Kildare and Wicklow, twelve and fifteen miles, to these bogs I have referred to.

41. In your valuation you have taken in a considerable margin of saturated land—mired land—but not flooded?—Yes.

42. You included that on account of the facility given for thorough drainage, I presume?—The concluding paragraph in my report I will read—"In all the above valuations I have acted on the supposition that the saturated lands would be permanently relieved from floods, and that the injured lands would be enabled to be thoroughly drained at least four feet in depth."

43. So I understood. You mentioned that the herb-ages has generally deteriorated of late years?—Yes.

44. Does that apply to the whole district?—To the whole flooded district.

45. What do you attribute that to?—The constant subsidence of the lands from the floods.

46. But then these lands have been for centuries subject to be flooded?—Yes; but I think the floods remain on the lands of late years a great deal longer than formerly.

47. And what do you attribute that to?—The

narrowing of the channel of the river. There is not the same waterway that there was formerly. It used formerly take about three days for the floods to come down from the Mountmellick district to the lower part of the Barrow, and then they would remain three days on it and go off, now the flood remains three and four months. I was driving from the Barrow district on the 14th of October, the year before last, down at Mr. Verschoyle's property, and I could not come back on that property until the following May, the flood continuing all that time. Surely that must destroy the herbage.

48. But these floods have been going on for centuries, why should they have increased so much of late years?—I cannot say—only I tell you the fact.

49. Do you think the rainfall has increased of late years?—Oh, certainly.

50. The year before last there was a very exceptional rainfall?—Yes. I know some of the Great lands in the county Limerick, high and dry lands upon which there was not a rush seed in the memory of man, and now they are covered with rushes.

51. And I believe in 1878 and 1879 there was a very heavy rainfall?—Oh, we had three successive wet seasons.

52. I believe these come periodically—in cycles—these heavy rainfall years?—I don't know precisely.

53. Do you remember 1873—wasn't that a year of very heavy rainfall?—It was.

54. Oh, yes—they come round in periods. Had your valuation any reference whatever to the existing state?—No. I put what I considered the present fair value on the lands as I found them—and I walked over them.

55. And you made no inquiry whatever as to the rent?—No, very little. I valued a great many of these lands twenty or thirty years ago for the proprietors and I am thoroughly conversant with the district, particularly in Kildare.

56. Did you take any cognizance of the effect of the drainage on the towns by which the river passes?—I think it affects part of Portlindine more than any other, for a large district of wet country must affect it.

57. Did you examine any of the townships?—I did—these I found were regularly flooded.

58. And as regards the effect on the towns themselves you did not notice it?—No.

59. Your valuation is by properties and townlands?—By townlands I valued.

60. Have you any means of pointing out the proportion upon each townland?—No. I did not go into townlands at all; I went by quailties.

61. In low, I presume?—Yes, that is the usual way with the Board of Works.

62. You carefully examined the soil in each case, and what it was capable of?—I did, and put down, according to the best of my ability, the present fair letting value of it.

63. Is the valuation based upon the supposition of complete relief?—Of complete relief.

64. Even against extraordinary floods?—Yes.

65. Does that complete relief imply thorough drainage?—No. It implies that the hyered lands can be thoroughly drained to a depth of five feet.

66. In point of fact, to get the full value, the drainage must be carried out?—Yes.

67. Would it be necessary for the proprietors or tenants to carry out additional works to get the full benefit?—They must carry out additional works to thorough drain.

68. Would thorough drainage be necessary in most cases or all cases?—I think it would.

69. Therefore it would be probably some time before the full benefit would be derived?—It would.

70. How many years?—Well, in thorough drainage benefit occurs almost immediately, but in these marshy submerged lands which are apparently so much deteriorated it might take two or three years after the drainage until the old bad plants died out.

71. And it takes seven years for the bad herbage to die out before it can be replaced by superior?—Yes, some time; but I could not say how long exactly. I know that in several places along the river the tenants are complaining of that.

72. Well, that is just the reason I am asking you the question; before you can expect the new grass to come up it must be sown down, the land top-dressed, &c.; isn't that necessary?—I think so, but in some places the new natural grasses will come up as soon as the old bad ones die out.

73. Do you consider the benefit of the drainage would relieve the lands from floods so as to extend up to the saturated area?—I think so.

74. Now, I am referring to a large area which is covered by fogs. I suppose you have seen fogs and mists there?—Oh, yes, along each side, and I have heard the people complaining of these fogs and mists. I have seen fogs often in the mornings, and particularly in the evenings.

75. To what height do you think do these fogs rise?—I think they are exhalations from moist lands.

76. You misunderstood my question. I mean to what level do they rise; do you know?—I do not.

77. You never noticed that?—No, not their height.

78. But I suppose you have seen the places look like a lake?—Oh, yes, I have seen it like a lake before me.

79. Well, is that injurious to the surrounding agriculture?—Yes, it chills the atmosphere.

80. And isn't it likely to cause mists?—Yes, I presume so.

81. And retards the ripening of crops?—Yes, but Dr. MacCabe will give you evidence upon that subject better than I can.

82. These heavy lying fogs to the height of fifteen or twenty feet, they set not dissipated until noon?—Yes, and they spring up in the afternoon again.

83. I presume you have seen the effects of arterial drainage in other districts?—Yes.

84. And has the effect been to remove fogs and mists?—Yes.

85. Have you experience of carrying out drainage works yourself?—I have had, especially in one extensive district in Tipperary—the Kilmacoddard river—where it was very successful.

86. Assuming that the top level of the moats was fifteen feet above the level of the water, or the marshy lands that would extend laterally to whatever contour the form of that level extended?—Yes.

87. That might be several miles?—Yes.

88. And take in a very large area?—Yes.

89. Do you think drainage of lands, in the way we are referring to, would improve the condition of the agricultural labourer?—I have not the slightest doubt of that. Anything that would give them better produce must improve their condition.

90. But the labouring population also, it would give more employment to the labourers, wouldn't it?—Well, it might.

91. And the effect of that would be to diminish the poor rates, probably?—Certainly. I have seen poor people down below Monasterevin driven bodily out of their houses by the floods, and having to seek refuge in other houses.

92. Therefore you think that the proposed drainage would improve the sanitary condition of the population by the removal of the floods?—Oh, decidedly.

The further examination of the witnesses was adjourned for the present, and

Dr. Francis Xavier Frederick MacCabe was examined.

93. Lord Castlemore.—We wish first, Dr. MacCabe, to ask your opinion generally concerning the sanitary condition of the district justicially comprised in the

valley of the Barrow. I think you know it all: from Athy up to Mountmellick and Pittinstown. Please give us a rough idea, and then the Commissioners will

Dr. Francis  
Xavier  
Frederick  
MacCabe.

June 18, 1893

Dr. Francis  
Xavier  
Frederick  
MacDole.

ask you any questions that may occur to them?—All I can tell the Commission about the valley of the Barrow is really of a general character, because some of the most flooded portions of it were never officially under my care. I never had, as Medical Inspector of the Local Government Board, anything to do with some of the unions which are within the flooded area of the Barrow. I had in my district the Union of Athy, which includes Monasteran, which is a flooded portion, and I had also the Union of Carlow under my care, so that in that way I took in Monasteran, Athy, Carlow, and Leighlin-Bridge, but everything south of that to the estuary of the Barrow was out of my district. And I don't know whether the Commission regard, as portion of the drainage area of the Barrow, the lands that border on the King's river, the Nore, and the Suir. If these are included in the inquiry I may say that I had no part of that district under my care.

94. I don't think we come down so far as that. The lands we are concerned with lie more in the district you first mentioned, Athy and Monasteran—I had the northern extremity of Kildare under my care too, but there was no flooding there; it was not until we passed Athy Union that there was any flooding. It is just five years since the Local Government Board sent a communication to me, enclosing among other documents a *procès-verbal* of a memorial, &c., addressed to the Irish Government, signed by the Duke of Leinster, the Marquess of Drogheda, and by Sir Anthony Weldon, as well as I remember, and in it some general statements were made as to the injurious effects of the flooding of the Barrow. The papers were referred to me with a request that I should state to the Local Government Board what were the injurious effects of such flooding and what sanitary benefits would be derived from the execution of drainage works; and at that time I took some trouble to make myself informed with the question as far as detail was concerned. I need hardly tell the Commission, that in the position I occupied a great many inquiries of a very different character were held by me between that period and the present, and I can only now state in general terms my opinion, except so far as the report I then addressed to the Local Government Board refreshes my memory. I stated to the Local Government Board that, as the reference they had made to me was of a general character, the observations that I would make should be also of a general character, as to the well known effects of flooding of areas of land on the general health of the population. Then I went on to say that the influences of water upon climate were very well known; that, during the progress of evaporation temperature is lowered, and that the larger the surface from which the evaporation is going on, the greater will be the climatic effect upon a district, and even upon a whole country. I stated that meteorologists had long been of opinion, for example, that the climate of the whole of Ireland would be improved, temperature raised, and rainfall diminished by the effectual drainage of the basin of the Shannon, and it was reasonable to expect that the complete drainage of the catchment area of the Barrow, which was estimated at 3,400 square miles, of which 600 were subject to flooding, would sensibly improve the climate of the south-east portion of Ireland. Well, of course, in making that estimate of 3,400 square miles I took the whole of the valley, the whole of the catchment area that lies between the Liffey and the Boyne on the northern side, the Blackwater on the south, the Slaney on the east, and the Shannon on the west, which is really and truly the geographical catchment area of the Barrow, because I regard, (as the Rivers Pollution Commissioners did,) the Suir, Nore, and King's River as tributaries of the Barrow, having a common estuary at Waterford.

95. It is noted here that the proposed area is 1,185 square miles—you have put it down at 3,400—and the proposed average is 768,000 acres—I have included the Suir, the Nore, and the King's river, regarding them as sub-tributaries of the Barrow, bear that

in mind. As all events I could only imagine that the memorialists who addressed that communication to the Irish Local Government Board, must have also gone upon the same lines as the English Rivers Pollution Commissioners, because they stated that 600 square miles were subject to flooding.

96. That is, the memorialists stated this in their memorial?—Yes. Well, I stated that the drainage of such an area must sensibly improve the climate of the south-east portion of Ireland. I then went on to point out that the description of land which absorbs the least amount of solar heat is the peaty soil, or "humus," of which so large an extent exists along the low-lying lands within the drainage area of the Barrow; that when such lands are flooded, or their surface waterlogged by recent flooding, the solar heat which should be absorbed by the soil is wasted in evaporating the water, and from this evaporation result fogs along the valley floor, a cloud-laden atmosphere, increased rainfall and general lowering of temperature, that such conditions favour the development of constitutional diseases, such as pulmonary phthisis (consumption), bronchial and catarrhal affections, and that lowered condition of vital power marked by stremous affections of every type; that excessive moisture also conduces to the development of acute and chronic rheumatic diseases, with, to the labouring poor, all their disabling consequences. Then it is mentioned for the information of the Local Government Board that, what is generally known in that part of the country as "bog humors" is nothing really but chronic rheumatism in cattle and horses grazing on flooded pastures, and that liver fluke or "rot" in sheep was commonly attributed to the animals being placed upon similar pastures. That has been so stated by veterinary authorities, and I stated it on the authority of those who had devoted themselves specially to the diseases of animals.

I know remarkable instances of that kind myself. I know of rabbits being affected with the liver fluke in the same way owing to eating wet grasses, but I was not aware before of the circumstances you mention.

97. The Fitness.—I pointed out that were it not for the presence of so large an amount of peat in the Barrow district, in my opinion, malarial would also probably prevail, and on that point I may add for the information of the Commission what was an interesting fact. I have a distinct recollection of having ascertained from the local penitentiaries at the time that malarial was not altogether unknown in the vicinity of the flooded regions of the Barrow; again occasionally seen, and what is more significant, other diseases that don't belong to the malarial group are apt to take a periodic type. This shows that there is a malarial influence at work, and must be taken for what it is worth in that way. The injurious effects that are produced in the towns and villages liable to flooding, are more serious. In these there can be no doubt that pulmonary consumption is much promoted, when the inhabitants live and sleep over a saturated soil. I added that Dr. Baskman, a very high authority, at the present moment Medical Officer and adviser of the Local Government Board in England, who was at the head of the staff of Medical Inspectors, and has devoted a great deal of his attention to this subject, published some time ago very interesting returns. I think it was in the 10th Annual Report of the Medical Officer of the Privy Council published in 1888, and if you refer to that, it will be found at pages 14 and 15. In that he has shown that the death rate from this form of disease in fifteen towns in England, has been materially reduced in consequence of efficient drainage, and the removal of subsoil water. More particularly he refers to enteric fever and diphtheria diseases which have a direct connexion with the condition of subsoil water, and he gave the annual rates of mortality before the drainage works were carried out, and after they had been completed, showing the very great improvement which took place

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amongst masses of population by drainage works. I then stated that where streets are flooded, as the sanitarians said was the case in Athy, Monasterevin, Portlanning, and Mountmellick, the house occupants are liable to deposits of sewage matter, either from back watering of sewers, if these exist, or from deposits of flood-borne sewage on the recession of the water. From these effects follow gastric derangement, very much seen amongst children, and enteric fevers. I found portions of the population suffering from a persistent form of diarrhoea, along the flooded margins of the Barrow, and this I attributed to the pollution of the wells by the rise of the subsoil water.

93. You say you found enteric fever prevalent—is it very prevalent?—No, where there is enteric fever there must be the specific germ, but where you have not the specific germ you still get an indication of filth pollution existing, indicated by the children getting gastric derangements and diarrhoea; and there can be no doubt of this, that the flooding of inhabited areas has indirectly a very detrimental effect upon the public health. That every medical man in practice in Ireland must have seen in this way, following a very wet period, when the streets and lanes are flooded and when the people cannot go out but are crowded in their houses, typhoid fever, which is one of the scourges of Ireland, becomes prevalent. Typhoid fever is essentially generated by overcrowding. The result of this overcrowding in houses owing to the flooding of the lands or of streets is, directly, an increase of typhoid which I need not say is extremely communicable from one person to another. There is another thing I would just like to mention. In my opinion one of the worst effects produced on the health of the inhabitants is that general lowering of the vital power that you had always associated with the absence of sunlight. Where there is an absence of sunlight, a dead-laden atmosphere and fogs along the valley lines the whole surroundings are depressing, and the result is that the vital powers which all possess are unable to resist ordinary diseases while those who are attacked by a disease feel it more, and are less able for the battle of life. In my opinion there is a great deal of chronic rheumatism in these badly drained regions. I took the liberty of further calling the attention of the Local Government Board, in my report, to what I attach very great importance to, because it was an Irish experience. Sir John McKerrill, who was then Colonel McKerrill, has given valuable testimony as to a diminution of fever in Portlanning where drainage works have been carried out. It is to the same effect as the report of Dr. Backhouse. Colonel McKerrill showed the good effect that had accrued in the neighbourhood of Portlanning—that sickness had been diminished, that the heavy fogs were less along the streams, that there was more sunlight and reduced moisture. I remember reading his report at the time with very great advantage—it is dated 27th January, 1873. I then said that "having thus stated in general terms the injurious effects which flooded areas are calculated to produce, it will be inferred that the advantages to the public health to be derived from the execution of drainage works would be elevated temperature, reduced moisture, more sunlight, and the absence or marked diminution of those fogs of disease which have been enumerated as proceeding directly or indirectly from the effects of flooding of a waterlogged subsoil." I have now given you all the material facts that I can remember, if I can afford say further information I shall be glad to answer any questions put to me by the Commission.

94. Mr. BARNES.—I dare say Dr. MacCabe that you have noticed that in those places which are subject to flooding and excessive moisture there is generally accompanying this condition of things a sort of craving for alcoholic excitement amongst the lower orders?—I have heard it stated not only with regard to those cases, but before that I heard it quoted as an excuse for the very large use of spirits in the Highlands of Scotland—owing to the constant fogs hanging there.

100. One of the effects of the proposed improvement of the district would be, perhaps, an improvement in the habits of the population in that respect.—It is to be hoped so, I think so—I venture to think so.

101. You mentioned that Carlow was in your district?—Yes.

102. Is it within your experience of Carlow that a complaint was made as to the flooding of the lower part of the suburb of Grange?—I am very glad you referred to that. I had very considerable trouble with regard to Carlow. A most significant fact struck me. I noticed that there was very little or no flooding in Carlow itself, but if flooding followed a period of long or moderately long drought, gastric affections, and diarrhoeal complaints amongst children, and even fever amongst adults, increased very much. This was so constant that it was impossible not to look upon these two circumstances in the relation of cause and effect; that whenever the Barrow was in flood, diarrhoea, gastric derangements, and enteric fever prevailed in Carlow. Well, I attributed that to the fact that the water supply of Carlow is exceedingly defective. The wells are sunk in the inhabited area through a limestone drift or gravel. These being superficial wells, when the flooding comes on the level of the subsoil water is raised, and it flows into the wells and polluted them. Therefore I thought that the flooding of the Barrow had a very injurious effect upon the people of Carlow, and I went into a good deal of detail about that. The subsoil water was able to get into the wells.

103. There is an impression prevailing in Carlow that the carrying out of the work which this Commission has to inquire into will produce increased flooding, higher floods; and if that be so, would it not be necessary to provide means by which that greater raising of the water and flooding should be somehow got rid of?—Well, it would be desirable, but that is very much an engineering question.

104. As to the means of doing it, but as to the desirability of doing it?—Any means that would prevent the flooded waters of the Barrow causing the subsoil water to pass into these wells would be beneficial to the health of the people of Carlow.

105. But the facility of escape of the water above will only send it down with a greater rush to the lower part, and it might at first increase that evil?—My idea is that the true remedy for Carlow would be to get a water supply outside the town.

106. That is as regards drinking water?—Yes.

107. But you will say that the injury is occasioned by the floods?—I say it will be necessary for Carlow to have a water supply outside the town, owing to the amount of sickness which the state of things I have mentioned occasioned, and I am sorry I was never able to convince the sanitary authority of the necessity of having that water supply outside the town.

108. In the village of Grange the flood comes into the houses, and if you send down water with increased force you must do something to prevent its doing still greater injury there?—Yes.

109. In your opinion, would that increased flooding bring probably increased disease?—Certainly so.

110. Have you any experience of Leighlinbridge?—Never in time of floods. I have been there two or three times.

111. Well, Bagnalstown was in your district also?—Yes. I have been in Monasterevin when the river was in flood. Monasterevin is especially flooded, and of course I have been through that country which one traverses by railway from Kildare to Athy. I remember passing through water on the Great Southern and Western line when the whole country on both sides was one unbroken sheet of water. I have seen that, and have had considerable uncertainty as to whether we should be able to get through it owing to its depth on the line.

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Fennellish  
Maine, Ohio.

112. But the climatic effect of the drainage of the valley of the Barrow would be felt as far as the town of Carlow—even where the flooded lands do not exist?—Oh decidedly the good climatic effects would be felt there. I am sure it would be felt over the entire area of 5,400 square miles that I have spoken of.

113. Sir James McKinnon.—You have personal knowledge of the towns upon the Barrow which are within the flooded district?—I have of all, except Portlannington, which may be said to be within the flooded district. My district went round Portlannington, but did not include it, and therefore I have no personal knowledge of it.

114. Well, Mountmellick?—That was not in my district. That was in the adjoining district.

115. Athy and Monasterevan—you have a knowledge of these?—Yes, for they happened to be in the union of Athy.

116. And do you regard them as being injuriously affected by the floods?—Unquestionably.

117. And they would derive material benefits by the drainage?—I am quite clear on that. Even without visiting those places that are flooded, I am quite certain of the fact that they would be all materially benefited and saved by the drainage.

118. Could you state any limit as to which the immediate effect of the drainage as improving the sanitary condition of the district could be laid down. Is there any contour line which would limit the area which would be immediately benefited by the drainage of the district?—Every place lying within the union of Athy would be most immediately benefited. I think these are the parts most severely flooded.

119. I am referring to the mists which extend over the sea. They extend to certain lateral limits, but these limits are, of course, defined by the height to which the fogs rise, which might be fifteen or twenty feet. You can see them in the early morning, distinct fogs like a lake before you. Would not that be the area over which the immediate effects would be felt, because these fogs are injurious to public health?—Absolutely they are injurious. You know the fumes of the ordinary dwellings are not concerned to keep out the water, and the people live over them, and wherever you get such flooding you get the injurious effects on the health of the people. But as far as the atmospheric influence goes—the absolute irritation to the lungs—I am sure it would just follow the fog line.

120. And to a certain lateral extent?—Yes.

\*120. Have you had any personal knowledge or opportunity of observing drained districts which have been improved?—Unfortunately I have not, but I should be very much interested in the Portlannington instance. It is the only one in Ireland I know of; and all I know of the fifteen towns improved in England is upon the authority of the officer of the Local Government Board. The Portlannington case is, I believe, the only one in Ireland on a large scale.

121. Lord Castlemore.—You mentioned the Shannon drainage as being likely—if the drainage were carried out over such a large area—as being likely to beneficially affect the health of the people generally in that area. Have you any reason to believe it has been drained partially, and have you heard it has produced any effect?—Well, no, I have never had anything to say to that district.

122. Would there be any means of obtaining evidence of that kind which would prove to us that where a large area such as the Shannon has been drained or partially drained, such drainage has specifically affected the health of the population?—If the drainage works of the Shannon were carried out to such an extent as to do away with the overflooding, and do away with the fogs, I think the only authority in Ireland who would be able to give you information such as you desire would be the Registrar-General. He would be able, if you wished it, to point out the lands, and he would know the returns of mortality from certain diseases which would be affected by a water-

logged soil, both before and since these works were completed. I was not aware that it had been carried out to such an extent.

Sir James McKinnon.—The lands have been relieved of all except extraordinary floods—but of course they are still subject to extraordinary floods. There has not been sufficient experience of the effect yet. The works were completed three years ago.

123. #Fleming.—Then there has not been sufficient time.

Sir James McKinnon.—The labourers and small farmers residing along the flooded lands are now able to live there all the year round. Formerly they were obliged to leave at times.

124. Lord Castlemore.—You say that malaria is largely diminished by reason of the large quantity of peat in the Barrow district?—Yes.

125. And of course you know that the peat is being used very rapidly. Now what would be the effect if the peat were all cut out, or greatly diminished—would malaria be increased?—Yes, I think you would have malaria there which you have not now. To have malaria it is thought by some authorities you must have a certain amount of decaying vegetable matter, and great heat, and an area sometimes flooded. I know in my own experience in Waterford where on the banks of a pretty lake I had an unequivocal case of malaria. There had been large rainfall, and then there was a dry sunny spring, and a large margin of the lake was dried up.

126. Do you think that practically by living from generation to generation on this water-logged soil the population there degenerates—do they appear to you to be a less hardy race?—Well I think they are but I would not like to say that, for there are many other causes—and most important causes. Within recent years a very disastrous change is coming over the people as far as their diet is concerned. People who used to live on potatoes and milk, and oatmeal and milk, now take white bread and tea. I look upon that as a very disastrous change, and if there were any deterioration I would be inclined to put it more on that than on any climatic changes, to which they may become accustomed. I think the effect would be felt more in the way of rendering the people less able to battle against disease.

127. Let us suppose the case of an epidemic, or epidemic of scarlet fever or scarlet fever. Is not the district or country of which we are speaking more liable to produce such an epidemic—and if it broke out would it not spread more by getting a house there?—Yes.

128. And towns like Athy, or Carlow, or Monasterevan, would be likely to be the hotbed of the epidemic and spread it through the country?—Yes, they might become a centre of diffusion. I quite agree with you.

129. I believe scarlet fever and sore throat are very prevalent?—I cannot say about that. At the time I was making inquiries about five years ago I did not ascertain there was any prevalence of dysentery, which I expected I might have found. At that time, perhaps, we might have been free from scarletina all round. On that point I may state that there is a remarkably good officer in the centre of that district. Dr. Durby of Monasterevan could give an account of valuable information from his records. A good deal of my information I had from him.

130. Mr. HENNES.—With regard to rheumatism, have you observed an increase of rheumatism generally among the rural population in Ireland?—Well I do not now come in contact with rheumatism. When I was in practice I saw a good deal of it, but I could not connect that with the present condition of things for it is not one of those diseases I come much in contact with.

131. Is that information to be had through the Local Government Board?—The Registrar-General could only give you information as to fatal cases, but the Local Government Board could get the information for you by addressing a query to the medical officers within the flooded area. They could tell at once whether

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organization has increased or not within any time you wish.

132. Is it within your knowledge that rheumatism is much more prevalent among the labouring classes in England than it is in Ireland?—That is not in my experience.

133. But you are not prepared to contradict that?—I have been in practice in England. I have seen more rheumatic fever in England, but that is a very different thing from ordinary rheumatism associated with crippling of the limbs. I am not prepared to contradict what you say.

134. Have the general climatic changes decreased or increased after great rainfalls in Ireland—are you prepared to give evidence on that subject?—No.

135. Lord CASTLEMEER.—Where could we get the most detailed information as to the sickness and death rate in the different towns—Monasteraven, Athy, Parturlington, Mountlick, Philipstown and Carlow?—From the Registrar General you could get the death rate; but if you want the rates of prevailing sickness, it would be better to ask the Local Government Board to favour the Commission by getting that information from the medical officers in the districts.

# Examination of Mr. Thomas Fitzgerald, C.E., resumed.

Mr. Thomas  
Fitzgerald, C.E.

136. Lord CASTLEMEER.—You stated as one reason why you particularly made mention of a certain district was, that it was a bog belonging to Lord Deaghda which would be very much benefited by the drainage, because they cannot cut down to the water level for turf on account of the bog water?—Yes. There are three or four premises there.

137. Would not that observation apply to all bogs, not merely to this particular drainage district, but to all bogs which would be relieved outside the drainage district?—Yes, certainly.

138. Say, for instance, would not the value of bog "A," which at the present moment cannot be cut down, be increased enormously if the people were enabled to cut down to a lower depth by the relieved area below that bog?—Certainly.

139. And the question of these valuations comes as the area as charged—how far back do you suppose it would be for to go?—I don't know.

140. Is there any reason of ascertaining it?—I don't think there is. You could put a very moderate general area tax on it.

141. The whole acreage flooded and submerged is 45,000. Supposing that area to be an oblong, with a river running in the centre of it, you would be able to go outside that area, and you would be able to put a value on the lands inside that oblong?—I had no idea to go upon with regard to any of the bogs, because I had no sections. But I know from Mr. Hill's report at the time I spoke of, when he said I was speaking on this matter before, I knew the depth of the channel, and I knew the facts relating to these Monasteraven bogs after going round them carefully, and after the people telling me of the great demand there. Therefore, I put what I consider a moderate acreable tax upon them of only 6d an acre.

142. But these are bogs outside these, beyond Philipstown and that district. Of course all these bogs would be benefited, although indirectly, by the same fact?—They would.

143. Therefore the area of charge could be increased almost indefinitely?—To these bogs, yes; but you could not at present arrive at that, until you saw what the operations were.

144. What I wanted to arrive at was, how far you could extend the area of charge indefinitely?—That is difficult to answer.

Mr. BURN.—That would depend on the level.

145. Lord CASTLEMEER.—Of course it is a difficult question. You are aware of the practice in England under the Drainage Act, of extending the area of charge very largely, and arranging it in belts, so to speak, putting the highest first, a lower charge on the second, a still lower one on the third, and so on till it comes down two pence an acre?—Yes, by what they call names.

146. Could that be adopted here?—I think it would be very hard to get the Irish people to agree to that.

147. But could it be adopted as an actual practical arrangement?—I don't see why it could not.

148. And I don't see why it should not. If you form an act you need only increase the same, and keep on adding to the money as you find the benefit accrues?—Yes, or widening the area.

149. In your valuation, is there anything relating

to the valuation of town property at all. Was that question gone into?—No.

150. Was there anything about the value of town property being improved by reason of the fact of the water not flowing in there?—No, I did not go into that.

151. Can you give any information as to whether the towns would be much improved?—Well, commencing at Athy, the outskirts of the town would only be improved. In Monasteraven the water does not injure the town, but it floods some of the gardens. I would not put any value on them until I would see how the work would affect them, for the excavation might cover the gardens themselves. The same at Parturlington. There can be no question but that the flooded state of the country must injure the health of these towns.

152. Would it be necessary to refrain what you call the submerged lands, supposing the main drainage of the river was effected; that is, to put small arterial drainage or small light drains all through. Would not the effect of the cuts being made in the main river be to render the value of the land on each side of it quite equal to what you have placed as your improved value, it would not necessitate any further expense?—I do not include any further expense, but anything in the nature of a running stream that had drained into I consider should be secured. As regards minor drains that is a matter for the proprietors.

153. Do you consider they would be necessary?—No. The occupiers should do these themselves.

154. Would it be necessary to do it?—In a few cases it might, but not generally.

155. Mr. BURN.—The actual increase of value that you have put on is really what would accrue to the district from main drainage works, even if so minor drains were done?—Precisely so. I did not take minor drains into account at all.

156. And I think your estimate of the increase in value is something over £10,000?—Yes.

157. Mr. BURN.—Ten shillings an acre?—Not so high.

158. Lord CASTLEMEER.—And with regard to your report, the reason you include this portion—this small part of the county Wicklow—and up at Kildare, Greengage, and Giffinstown, is on account of the benefit which would accrue?—The deepening of the river would dry up these places situated there on the map. I cut out some districts which I thought were quite high enough for independent drainage.

159. Mr. BURN.—And is not that district high enough for independent drainage?—No.

\*159. Supposing the main drainage in the valley of the Barrow is done, are we not going out of our province in going up to other drainage districts.

160. Lord CASTLEMEER.—I want your opinion upon this subject. If we are to go into the valuation of a particular district relieved by the drainage of the main body of the Barrow, we may perfectly well extend our area to other districts because, naturally, other districts will be benefited by it. How do you draw your line as to what district you take in or what district you leave out?—The district which was included within the catchment basin, according to the original maps made out by the Board of Works some

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years ago, was considered by me. I went into the whole matter, having those maps before me, and where I found land perfectly independent, I cut it out, and where I found land that would be benefited, I included it.

161. Mr. CAMMER.—At what depth do you say the submerged lands would be drained?—They could be efficiently drained at four feet deep.

162. Mr. BARRE.—Those districts in the county Wicklow, are they such as could not be drained except by altering the levels?—No, you have not land enough to pay the expense of it.

163. What I want to know is—could these two small portions in the county Wicklow be drained independently of the others?—I don't think they could; one bit might.

164. You say the expense would be too great?—Yes, because there is only a little narrow margin. Where the proposed work would improve the land, I thought it only fair to put a charge on it.

165. There is no other land that would be improved sufficiently there to bring it within the district?—No.

166. Lord CAMERON.—As to the Queen's county, I see the flooded lands are put down at 7,305 acres, and the injured lands 3,564 acres. Would you say it is not possible to go further back in the Queen's county. There is no other land that would be improved by the drainage of the whole basin but those lands you have included?—I don't think there is.

167. And the same remark would apply to lands in the King's county and Kildare, as well as the Queen's county?—Yes.

168. Neither directly nor indirectly?—Neither directly nor indirectly. I made my examination of the land with as much care as I could, to prevent parties coming in and opposing claims, saying they were independent.

169. There is a river that I am personally acquainted with, and therefore I speak of it, you know—the Strudally river. The stream just above Strudally is called the Borthogus?—Yes.

170. Well, part of the Borthogus district is my property, and there are also three or four other properties on it. It was proposed to drain it, but it is believed to be impossible to drain it, owing to the fact that the Strudally river sends back water?—Yes.

171. Well there is a case in point. Supposing that these drainage works were carried out—supposing the Strudally river was drained and cleared, and every improvement made on it—I and the others in the Borthogus district would be immediately able to drain that district. Therefore we should derive a real benefit without contributing to the area of charge?—I think some of the Borthogus is included in my schedule.

172. How far do you go beyond Strudally?—Up to Orchard. That was the limit marked on the original plans of the Board of Works.

173. You have no knowledge that there would be other lands above that affected?—I don't think there is. Until the sections are prepared I don't think it would be right to interfere with the mills at Strudally. I had no means of ascertaining whether they would be affected. If they are unjustly affected it would be better to abandon that district, because there would be a very heavy charge for injury to these mills.

\*173. Mr. CAMMER.—Would not they be benefited by the increased fall?—If you deepened the river above you should lower all the machinery.

174. Lord CAMERON.—Can you give me any idea as to how the question can be met—the question of getting back very far into an area—or laying down some specific margin. In what way can that be best met?—The only way that could be met would be by the engineer declaring the levels he would go to, and then you would see what country lying beyond would be affected.

175. Supposing the country lying beyond was found to be benefited by the improvements made below, how would you meet the question of the area to be charged?—I think there should be a further valuation when the works were completed.

176. And you would apportion the expense on the entire area, then?—Yes.

177. Thereby increasing the area charged?—Yes.

\*177. And diminishing the expense practically on the original area?—Yes, on the original area. I don't see any other way of doing it. There could only be done after the works are finished. If you do it now you would raise great opposition in the country, and people would only be saying, "We are independent, we are not affected at all."

178. Would it be possible to do that; is there any law permitting such an arrangement?—I am not aware of it, unless you brought in such a provision under a special Act.

179. But at any rate you confined your valuation entirely to what was laid down by the Board of Works?—Yes. I had permission from them to change or reduce it as I found it.

180. Mr. SMITH.—Did you find in some places that from the large accumulation of sand the course of the river was a good deal changed?—Well, not on the main bed of the river below. It was changed up in the rapid parts about Mountainlick.

\*180. Is not that always the case in gravelly rivers affected by mountain streams?—Nearly every fresh flood makes a fresh course for itself.

181. Did you find these new courses a good deal checked by trees?—Very much neglected.

182. And that was very much the cause of the water being detained on the land so long?—Yes. There are a lot of old trees about Mr. Warkintee's place, down in the bed of the river for years, and all these impede the water. There is no supervision over the entire channel. I may mention that I got a letter from Mr. PARRY, the Secretary of this Commission, directing me to attend here, and at the end of it he states, for my information, the remuneration I will be entitled to according to the scale sanctioned by the Treasury (read the letter). I decline to accept these terms under any conditions, for I do not see why I should receive less pay from the Treasury than from the public. I only ask to be paid, while I am engaged, the same as I get from any private individual.

Lord CAMERON.—I may state that the matter has been referred to the Treasury.

183. Mr. SMITH.—In case any individual complained of his valuation or share of the expense, could you give us any information as to the value of his holding. Have you the value of each holding in any way?—No, not of the holdings.

184. Lord CAMERON.—Only by townlands?—No, by quilles. These are all marked upon your maps.

185. Supposing an occupier desirous to test the value you place upon his field or particular portion of his farm, he is able to do so by referring to a number on the map where that particular portion is?—Yes, he will see where his holding on the townland is.

186. Mr. SMITH.—And the quality is marked by three different scales?—By the prices. There is the price per acre, the present value, and the improved value.

187. Mr. BAKER.—Supposing I was an occupier in part of this land proposed to be drained and charged, how should I go about finding out what I had to pay, that is, supposing the Commission recommended the work to be carried out?—That must be all gone over after by men who would see the exact points on each farm. That has been the practice always in drainage works.

188. Supposing I am an occupier there, could I come up and see the plans, and your valuation showing the present value and the improved value?—The boundaries of farms are not given at all.

189. Then it is impossible for me, as an occupier, to find out what I should be subjected to by the drainage improvement?—At present, yes.

Sir JOHN McKEENE.—Without professional assistance he would be in a difficulty. But with some professional assistance it would be easy, for in a moment he would be able to see the value put upon a particular place, including his plot or farm, and he could calculate how much of that would be chargeable to him.

190. Mr. BARNES.—But what means are we to put at the disposal of the public intended for finding out what they have to pay?—You see, on each of the maps there are numbers and the numbers are referred to in my valuation books.

191. Lord CASTLETOWN.—The only way to give such information to owners, of the prospective improvement of their lands, and also the probable charge, would be by describing to them that the improvement of the townland would be so much, and then let them find out as best they could, how far their farms in such townland would be affected?—Yes, or if it was affected at all. By referring to the map, an owner could easily mark out the boundary of his farm and see if any of it is affected, or any of it included.

192. Would you suggest that it would be the simplest means of pointing this out to the local people, to send down copies of these valuation schedules?—Yes, and to lodge copies of the maps in different places. The usual course, when it is decided to go on with what is called a preliminary valuation, is to ascertain what the districts would be, and then after the works were decided on and contracted for, to go over the lands again when the occupiers' holdings were marked and the prices were retained. It was usual to ascertain the acreage, and it was then all changed.

Sir JOHN McKEERIE.—That question never arose until, in fact, the works had been completed, but I think, under the Act of 1874, schedules were provided for showing the tenants' holdings.

Mr. PENNY.—The schedule gave the name of each tenant and all the particulars required. There was only one survey.

Sir JOHN McKEERIE.—The ordinary valuation schedules, under the Act of 1874, showed the tenants' holdings.

Lord CASTLETOWN.—Then why does not this valuation show it?

Mr. PENNY.—Because, under the Act of 1865, the

proprietors got up the preliminaries themselves. They lodged them with the Board of Works, that an inspector might be appointed. The documents were then lodged in the district—an inspector was appointed, and heard objections to them. Such a state of things does not arise here. This is a new form altogether.

Lord CASTLETOWN.—It would be much simpler if we had the tenants' holdings before us.

Sir JOHN McKEERIE.—I don't see that there can be much difficulty about it, if the districts are divided into small portions, and the people in each district, so divided, have notice given to them, every opportunity will be afforded to the tenants to make their objections, that is, according to the extent of the estate. Of course, it would never do to invite all the tenants to make objections, for there would be no end to the thing.

193. Lord CASTLETOWN.—You have been over the ground, Mr. Fitzgerald. What would be the simplest division, taking your valuation into consideration, to divide the district into for local inquiries—nearly as a suggestion to the Commission?—Mountmellick would be one; Philipstown, at the extreme limit of the King's County at that side; Monasterevan, Portlough, Ashly, and Kildare. Monasterevan is a very important place. It is the key to the entire middle district. All about Major Browne's place can be easily worked from Kildare, and the lower reach from Ashly.

194. Mr. SMITH.—Just looking at this valuation of yours here casually, I find in the first one on the top of the page, having reference to map 54, is No. 1, seven statute acres, present value, 50s. per statute acre; increased value, 20s. The increase would be 35s. 6d. the Irish acre. That looks very high?—Oh, that is a bit of rich alluvial meadow at the outskirts of a town.

195. I see, as a rule, your increased value runs from 3s. to 20s. the Irish acre?—Yes.

The Commission adjourned till 24th June.

June 22, 1885.  
Mr. Thomas  
Fitzgerald, c. s.

## WEDNESDAY, 24th JUNE, 1885.

The Commission met at La Touche's Bank premises, Castle-street.

Present.—The Right Hon. H. BROWNE, Vice-Chairman, presiding, Sir JOHN McKEERIE, Mr. CANNERY and Mr. HUMPHREY SMITH.

The Secretary, Mr. PENNY, read the minutes of the previous meeting which were signed. He also stated—"I had a letter from Mr. Haugard this morning, stating that he could not attend here until the end of the week. The letter was written to the Chairman. He states that he will read Mr. Manning's evidence very carefully, and that when he goes over the maps with him it will answer all the purposes that he requires."

Mr. BROWNE.—I think it is rather inconvenient that we have not Mr. Haugard here during Mr. Manning's evidence.

Mr. SMITH.—Mr. Haugard is crossing over to night, and as I understand we have to sit from day to day during this week, he will be able to be here to-morrow.

Mr. BARNES.—And then Mr. Manning will, perhaps, be able to continue his evidence, if he does not finish it to-day.

Mr. Robert Manning, c. s.—I am very much pressed for time, but of course I will try and be here to-morrow; but I will require in a day or so to leave Dublin, and I will be away all next week.

Mr. BROWNE.—Well, if Mr. Haugard is here to-morrow, it would facilitate our proceedings very much.

Sir JOHN McKEERIE.—But Mr. Haugard thinks it necessary to make himself acquainted with the general details of the engineering, before Mr. Manning gives his evidence here.

Mr. Manning.—It is only within the last few days that the particulars have been given to me, so to the

value. I was out of town, but I have anticipated my report by getting part of it printed; but I have unfortunately in it all the information you require. I cannot now formally lay my report before you until it is revised.

Sir JOHN McKEERIE.—But there is nothing to prevent you going on with your observations on your own project—the engineering design.

Mr. Manning.—Oh, I can do that.

Sir JOHN McKEERIE.—It does not seem to me to be of much consequence whether you have the valuations or not. It will be very important that you should be able to tell us what the approximate cost will be.

Mr. Manning.—Oh, I could tell you that to-day.

Mr. BROWNE.—Well, I think the Commission would like Mr. Manning to go on with his evidence.

Sir JOHN McKEERIE.—And to give a general statement as to his project. It is rather unfortunate that Mr. Haugard is not here. It would be better if he was here to ask questions of Mr. Manning, than that he should enter into a private investigation with Mr. Manning after an inspection of the maps.

Mr. BARNES.—He could also inform the members of the Commission themselves on certain matters.

Mr. SMITH.—Yesterday it was quite decided that we should keep sitting for two or three days, and Mr. Haugard will be here to-morrow.

Mr. BROWNE.—Well in the meantime we had better go on with Mr. Manning's examination.

Nov 25, 1875.

Mr. Robert  
Manning, &c.Mr. Robert Manning, &c., M. Inst. C. E., Chief Engineer to the Board of Works in Ireland, *examined*.

136. I have here a proof of my report\* which is in the hands of the printer, and I shall endeavour to go through it and give you in general what it contains. I first describe the catchment basin of the Barrow which is known by you all. Its source is on the Slieve Donard range of mountains at a height of 1,071 feet above the level of the sea. I state that from thence the river, which is here called the Glen Barrow river, flows in a north-easterly direction towards the village of Rasmah. From thence it flows in a north-westerly direction to Rushclogh bridge where it is joined by the Glendoh river, and lower down by the Omeau and Blackwater rivers and several minor tributaries; it passes about one mile to the north of Mountsblach below which it receives the waters of the Triogue; then through the town of Furlingston to Monasteraven where it has a catchment of 108,300 acres. A short distance above the latter town it is joined from the north by the Figgie river, which has a catchment of 167,400 acres, the united catchment of both being 275,700 acres. The Figgie itself has a number of tributaries such as the Phidpatown, Chalkins, and Siate rivers. From Monasteraven the Barrow flows in the southerly direction to Athy, having been joined in its course between these towns by the Finery, Killenry, Stradfield, and Timogree rivers and several other streams, the total catchment at Athy is 465,790 acres or about 637 square miles. The length of the Barrow from its source to Athy is about forty-seven miles, and that of the Figgie from the Glendoh river to its junction with the Barrow above Monasteraven is nineteen miles. In the whole of that large district there had been only two cases in which an improvement had been made by drainage executed under the provisions of the Drainage Acts. One is the Rathangan drainage which is formed on the upper part of the Siate river, and the other is the Kildare district or Tully river which is a branch of the Finery. In the Rathangan district they have drained 8,845 acres at a cost of £3 12s. 3d. per acre; and in the Kildare district they drained 2,345 acres at a cost of £3 11s. 8d. per acre. I may anticipate what I have to say by stating that the present project for the whole Barrow costates 45,841 acres to be drained, and taking one with the other they would cost on an average £10 11s. 3d. per acre. I have made out the cost of each of the tributaries separately, but I may tell you that the average cost of the whole drainage is greatly increased by that of the works which I shall describe by and by as necessary for the Great Barrow. It taken by themselves, and excluding the tributaries altogether, it would cost about £34 1s. 4d. per acre, the whole averages £10 11s. 3d. I shall be able to give you for each stream the quantity of land, and the gross improved value of the cost of the works for that particular section. Now, the first step towards proposing the improvement of such a district as that is obviously to determine what is the quantity of water we have to deal with. That is a most important matter, and, therefore, in my report I entered very fully into the data which I have taken to govern me in estimating that quantity. I may say that I was engaged more than thirty years ago as a district engineer upon the arduous drainage of Ireland, and I have had a number of long years experience of the discharges we have had from Irish rivers. At first the Commissioners of Public Works based their calculations of the quantity of water to be discharged upon a rule which was a moderately fair one, and that was that half an inch of rain would be discharged off the whole surface of the basin of any river in twenty-four hours, and that would be equivalent to a discharge of about one and a quarter feet for every acre per minute. That was found to answer very well in the eastern part of Ireland and in moderately large districts, but it was found not to answer in the west of Ireland. I am now talking of the early days of drainage before we had experience. It is now more

than thirty years since I designed two districts in the west of Ireland, and I assumed the quantity of water to be only  $\frac{1}{2}$  cubic foot, and  $\frac{3}{4}$  cubic foot per acre per minute. After the works were finished I found that the actual discharges observed were  $\frac{1}{2}$  foot and something less than  $\frac{3}{4}$  foot per acre. But that discharge, great as it was, of  $\frac{3}{4}$  foot per acre instead of being  $\frac{1}{2}$ , was thrown entirely into the shade by some extreme cases in which we had no less than districts of fourteen cubic feet per acre. Well, now take another case opposite to that in the largest river we have—the Shannon—with its 2,500,000 acres of catchment, and large compensating reservoirs of 80,000 acres, or about one thirty-second part of the entire catchment, that is, that the whole land which is feeding the Shannon is only thirty-two times as large as the lakes which act as a sort of compensating reservoir. Our observations make the discharge 1,600,000 feet per minute, or about two-thirds of a cubic foot per acre. Again, we have another case—that is, the river Bann at Toome. As you are aware, the river Bann has a large reservoir of 100,000 acres in extent, dividing the Upper from the Lower Bann. I was called upon to make a report on that river in the year 1877, when there was a great flood, and then I found that the discharge was 682,000 cubic feet per minute from a catchment of 1,195,000 acres. That amounted to rather more than half a cubic foot per acre, the area of that large lake being 150,000 acres, or one-twelfth the entire catchment. That is a reservoir which can control floods from an extent of country twelve times its size, discharging water into it. I found on that day that the lake rose four inches, which represented a discharge of eight-tenths of a cubic foot per minute, so that if that lake had not exercised a compensating power, instead of having a discharge of between half and eight-tenths of a cubic foot per minute, you would have nearly one and a half feet per acre per minute from that large district. We have other facts bearing upon this subject, both in this country and in England. Mr. Bateman, a well-known engineer, and past president of our institute in London, made a report in the year 1868 to the Town Council of Manchester, and gave several instances, both in England and Scotland, where discharges from areas varying in extent, which amounted to from ten to thirty cubic feet per minute per acre, whilst the highest spoken of in Ireland was thirteen. I could enter into more details, but probably it would be tiresome to you; but this will show you how fallacious it is to ground a project on any general calculations upon the quantity of rain, or the amount of evaporation. It is really a question of skill and experience in these matters, and also observation, and in this present case it is very well we have not to rely upon any such data, because we have nearly thirty years' experience of a river lying close upon the Barrow—that is the Brosna, about twenty miles to the westward of the Barrow basin. Mr. Kane, who skilfully assisted me in getting up these plans, had over thirty consecutive years' observation of the great Brosna river, and the quantity of rain that fell at Tullamore. It appears that the greatest annual quantity of rain was about forty inches within thirty years, and the least quantity was about fourteen and a half inches, and the greatest rainfall in twenty-four hours was two inches. That occurred in the month of June, 1877. Our catchment here is 400,000, and that of the Brosna 285,284, and the greatest discharge from that was 367,477 cubic feet per minute, being within a fraction of one foot per acre per minute. Therefore, on a full consideration of all these facts, I am inclined to take the discharge from the Barrow at Athy at 400,000 cubic feet per minute, and I am of opinion that the greatest flood which may be expected to pass Athy bridge will never exceed that. I have stated further my opinion that I think this estimate may be possibly reduced to 350,000—that is if you exclude the extraordinary floods which take

\* See Appendix.

June 28, 1883.

Mr. Robert  
Manning, C.E.

place merely and at long intervals—and the great winter floods will not exceed 350,000 cubic feet per minute. I have, however, thought it prudent to make provision for the larger quantity—400,000. Now the next thing is to consider in what way the quantity of water, how are you to calculate the size of the channels that will be necessary to discharge it without injury to the beds. Of late years engineers have had a great deal of discussion as to the proper way of calculating the quantity of water to be discharged. We have the formulae of Du Buat, Prony, Rydvalm, Herr Kater, Darcy, Bazin, Lefsch, and others. They have all more or less agreed as to the proper way of calculating the quantity of water to be discharged by a river, but however that may be, and however well it would be to go into practical questions, I may say with regard to the Barrow that bearing in mind the quantity of water to be discharged, the channels which I have designed are amply sufficient. My calculations are based upon principles upon which all these men practically agree. You may take the opinion of any of these gentlemen I have named and you will not find a material difference between it and my views, so that you may be perfectly certain that if the quantity of water be 400,000 cubic feet per minute, the channels will be amply sufficient to carry away the discharge.

Mr. BAKER.—Do I understand you to say that the maximum would be 400,000 cubic feet per minute?—Yes, 400,000 cubic feet per minute will be the discharge which I stated will be the highest discharge at the maximum flood at Athy. Now then as to the works proposed, I think gentlemen that you are all as familiar as I am with the causes of the flooding of the lands adjoining the Barrow. Now going from Athy upwards, the first impediment is what is called the Duke's weir. The next great impediment is the shoal at Bert and the third would be the shoal under the aqueduct Monasteraven. The shoal at Bert will require a cutting of no less than 8 feet under the present bed of the river, and there will be a cutting under the railway bridge of probably 4 feet, and in a place called Passbridge, a short way above it there will be no less than a seven-foot cutting. I need not go into details on the other tributaries. I have carefully examined them, but I need not tell you the particulars. It is enough to say that I find the size of the channel which I propose at Athy, to be have a bottom of 150 feet, and a depth of  $\frac{1}{2}$  feet to the surface level of the flood. As we go up the river, I decrease it to 140, 120, 60, and so on until we get smaller, but providing for a discharge of 400,000 cubic feet per minute at Athy, and about 285,000 at Monasteraven. With regard to the tributaries, there is one observation I would wish to make. You will observe that when I said in the sections of which these are proofs that I have before me, that the upper part of the river, both of the Barrow and Figlie, are very steep, and therefore, I have been obliged to design steps so as to decrease the fall in each of them. I think that is a matter when the works are being carried out, that would require the greatest care and attention, particularly in one of the rivers. There is a little river called the Ovensma which brings down a quantity of sand and silt, in fact, at Portmashinch you will see above the bridge there a large quantity of silt. That principally comes down from Ovensma river and one or two others, and it will require very great care in making a detailed design of the river's course. I have put in such dimensions as will be certain to give you more channel than is enough, and any change in the dimensions of these channels will not affect at all the amount of my estimate. I don't know that there is anything else that I can say anything about.

192. Mr. BURKE.—In mentioning the catchment, you did not say anything of the catchment at Garry-hinch. There is a large quantity of land there covered with water—I can give you the catchment. We will take the river Barrow. Now, I told you the catchment at Athy and Monasteraven, and Portmashinch, and then there is a place called Portmashinch. From

Portmashinch to Trillick the catchment is 83,300. I have also told you the catchment at Figlie river: it is 167,400 at its confluence with the Barrow; it is 78,000 at the junction at the Slane river above the Rathangan drainage district.

193. Mr. BURKE.—Do your proposed works include anything below Athy?—Only so far as the navigation is concerned, about half a mile below Athy. It is in my mind now, that I have not mentioned anything whatever with regard to the interference with that navigation, by the proposed works. I know that apprehensions have been entertained that this immense quantity of water that will be sent down will drown them. I do not concur in these apprehensions. It is obvious that it is not the quantity of water that injures the navigation, but it is the velocity with which the water is sent past the navigation. I do not think there is any great difficulty in executing works at the crossing of the river above the navigation, that would prevent any inconvenience to the navigation. In my opinion, instead of injuring it, it would have the contrary effect, and be rather an improvement. There is another question also which I neglected to speak of, and it is in regard to the mill interests. I have not thought it well to go into any details of any particular mill cases, because when the works go on these will become a matter for a decision by a Court, and it would be very embarrassing to myself if I were employed as a witness to go before the Court, and to give any special particulars of these cases, if I now gave my opinion here. I can only say that I have provided in the estimate for the purchase of the mills if it is necessary, or for doing such works as will obviate the necessity for purchasing. Therefore, you will understand that my estimate includes the question of mill power, and I am happy to say that I need not purchase with more mill-power in the entire district than one mill—that is the mill at Bert. That mill must go out of it. There need be no secret about that—that mill must be purchased. The others we can deal with as we come to them.

300. Sir JOHN McKEOWN.—Is it complete relief that you have provided these under all the circumstances. I mean whatever the magnitude of the flood may be, will there be complete relief to the lands?—Well, I don't think that any engineer would state for a certainty, that under no possible circumstances there would be no flooding; but I may mention that, that I have taken the data on the same quantity of water as the Broome, which has a similar catchment, and I found that only upon one occasion, in the year 1851, there was a discharge of 267,000 cubic feet per minute, as I mentioned, and never since; and without going the length of saying positively, that a flood will never come over the lands again, I don't believe there will. The only question which rather perplexes me, will be whether the rise of the channels might not be reduced, because we have these facts before us, in reference to the Broome—in the year 1851, there was a flood of 267,000; in the year 1852, there was a flood of 238,000; in 1877, there was a flood of 236,000, and another flood of 216,000; and in 1876 there was a flood of 200,000, so that the discharge at the Broome is between 200,000 and 270,000 cubic feet in a minute. I have provided for such discharges on the Barrow, and I think we would be perfectly safe in doing that.

301. But in the sections where you provided it at particular points, you mention above Athy, at Bert, there is a large cutting. That, I believe, is the largest you have?—Yes, up beyond Bert we have the maximum bottom which will discharge the same quantity of water as at Athy—160 feet—which gives a discharge of 400,000 cubic feet per minute.

302. You mentioned that your design is to excavate to a depth of 8 feet there?—At Bert—yes, to 8 feet—that is to 8 feet under the present bottom of the river.

303. Is it necessary to sink to that depth, I mean,

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for the purpose of relieving the lands?—Yes, and I will show you why. (Witness explained on a map.) There the water won't go in on the lands at all. It will pass by. We have only a fall of 15 inches in the mile there.

204. My question had reference to the consideration whether a lesser depth might not be given with such additional width as would be necessary to compensate for the difference in depth. Whether that would not be a more economical system?—Oh, no doubt, if you could get a very large width. The channel is 160 feet, and if you take the spoil banks which we are obliged to purchase on each side there would be a very large quantity of land taken. I agree with you in what you say, that where possible it would be well to avoid going to such a depth and to give a greater width. I endeavoured, in my original design, to see if I could get rid of so great a depth by giving width to compensate for it.

205. Mr. SMITH.—But supposing you took additional width, would there be any danger of more accumulations of sand collecting?—Oh that question of velocity is a very serious one. I have endeavoured to make the channel sufficiently small so as to give a velocity that won't allow a deposit, but a matter of great difficulty has been to reduce the velocity for we have too much of it, and I have introduced steps here (indicating on the map) which are like weirs to get rid of that velocity.

206. No doubt you observe curves on the river—is there any provision for straightening these?—Oh if you look at the map you will see that I have provided for a new cut over where you see the red line.

207. Sir JOHN M'KENZIE.—You have not given here the details of the tributaries as separate from the main river?—Oh, yes; there is a draft of them (document handed in).

208. When you speak of the Great Barrow, does that mean the main river throughout its length?—The Great Barrow runs from Aiky to Monasterrean.

209. Mr. SMITH.—But doesn't it continue further up?—Yes, but not separately. Sir John M'Kenzie asked me as to the cost of these tributaries—whether I have taken in the river flood of the Great Barrow independent of tributaries.

210. Sir JOHN M'KENZIE.—The Finisky river comes next in order?—Yes, that is a tributary of the Barrow and is the second most important feature in the whole district. It contains 6,650 acres of injured land and the improved value per acre would be 3s. 6d., and the cost per acre would be £3 6s.

211. Practically that in itself could be carried out as a paying district—what I mean to say is that the return would be nearly equivalent to the cost?—Yes.

212. What I mean to say is, if the money were advanced to the community under the Act of 1831 it would be very nearly a paying district. It would just come within the 5 per cent. The money advanced would be repaid by instalments extending over 35 years at 5 per cent. The actual benefit would be a little over that. The improved value per acre is 3s. 6d., and the cost per acre is £3 6s., which is nearly 1s. in the pound; 3s. 6d. would amount to 5 per cent. The next is Maryborough Heath?—Yes.

213. Is that a stream?—Yes, a small stream.

214. The acreage is 729; the improved value per acre 3s. 6d., and the cost per acre £4 4s. 16d. That would come to something more than 6 per cent. Then Ballynattas which you put the cost per acre at £5 2s. 9d., and the improved value 3s. 9d. As to Strathilly river I see the acreage is 1,958; the cost per acre £5 12s. 2d.; and the improved value 4s. Why the cost would be nearly 7s., while the estimated value would be only 4s. Well you have put the Kyle and Tynogue rivers together. The acreage is 438; the improved value 4s. 4d., and the cost per acre £3 13s. 16d., so that the cost would be about 9s. 6d. an acre, and the repayment per acre, if advanced, 4s. 4d. The Little Barrow has 13,244 acres; the cost per acre, £6 18s. 3d.; and the im-

proved value, 4s. 1d. per acre; so that the cost would be nearly 7s., and the benefit 4s. 1d. The Tynogue has an acreage of 1,380; the improved value, 6s. 3d.; and the estimated cost per acre of the improvement, £9 18s. 10d. That would be that they would have to pay 16s. for a benefit of 6s. 3d. The Owmans has an acreage of 1,020. The improved value is put down at 3s. 3d., and the cost per acre, £15 8s. 5d. That would be a cost of 13s. 6d. for a benefit of 3s. 3d. The Figh river has an acreage of 5,738. The improved value is put down at 5s. 10d., and the cost per acre at £9 10s. 5d., or a cost of 9s. 9d. per acre for a benefit of 5s. 10d. The Coshina has an acreage of 2,143. The improved value is set down at 3s. 8d., and the cost per acre at £5 5s. 7d. That is an estimated cost of 5s. 3d. for a benefit of 3s. 8d. The Shie river, the acreage is 1,219; the improved value, 4s. 3d., and the estimated cost per acre, £3 10s. 3d., or a cost of about 5s. 6d. per acre for a benefit of 4s. 3d. Then you have the Philipstown, with an acreage of 2,328. The increased value per acre is set down at 6s., and the cost per acre £6 16s. That is they would have to pay 6s. 6d. for a benefit of 6s. Then, upon the whole, the average is £10 11s. 3d. per acre for the cost. The benefit, I say, you have not down, but I suppose the average to the tenant will not probably be greater than 4s. 6d. per acre, while the cost upon the whole would amount to 10s. 6d. It is a pity Mr. Haasard is not here to ask questions upon the general principle; but I think there are some questions it is very important the Commission should ask for information upon from you, Mr. Manning, with regard to the effect of the tributaries on the main river, as well as the floods?—Certainly, I shall be happy to give you all that information.

Mr. BARRY.—I think it would be unavoidable not to ask Mr. Manning to come again when Mr. Haasard will attend.

Witness.—But I will be engaged the whole of next week.

Sir JOHN M'KENZIE.—The few questions which I have been suggesting are with the intention of leading you to know what questions we would be likely to ask of you. For instance, what would be the effect if you only drain the tributaries, and not drain the main channel.

Mr. SMITH.—If you don't drain the Barrow you can't drain the tributaries, for there won't be a fall.

Sir JOHN M'KENZIE.—You can drain many of the tributaries.

Mr. BARRY.—The Owmans passes near where I live, and I know when there is a flood in the Barrow the water is kept back altogether in the Owmans, even in its present state.

Mr. BARRY.—Perhaps it would be better if Sir John M'Kenzie were to put in detail, questions as to each of these tributaries—whether they can be efficiently drained without draining the main river?—That is independent of any bad consequences that would result to the main river. I should like to consider that question and go over the whole of the detailed sections.

Sir JOHN M'KENZIE.—We have an instance of it at Rathangan district and Kilhare district, where certain rivers have been efficiently drained without the drainage of the main river.

215. Witness.—With regard to the Owmans, I think the back-water is from the Small Barrow. Sir John M'Kenzie was talking to me of the effect on the great main river and of the Barrow from Aiky up to Monasterrean. That is the Great Barrow. I think the Figh river goes in one direction and the Little Barrow in another.

216. Mr. SMITH.—Is the Little Barrow the one that passes by Portlinton to Mountlick?—Yes.

217. And Mountlick river is subject to the flood from the Sherwood mountains?—Yes.

Mr. BARRY.—Well now as regards our district—the Owmans at Mountlick—the water from it is down a day sooner than from the Barrow. It comes down the mountain sides more rapidly, and there are

two small weirs at both ends of our town, about two feet each—they are kept there for the purpose of raising the water to a brewery and mill house; and, I think, if these two were removed it would be a great saving of floods. That would facilitate the discharging the drainage to a level.

(Lord Carlisle then entered the Board Room and took the chair.)

Mr. JOHN McKENZIE.—The reason of the water being down there sooner from the mountains is on account of its coming down a more precipitous declivity.

Witness.—Mr. Hasard stated that he would go over all the details at my office, and I shall be happy to go into the whole matter with him when he comes over to-morrow.

Lord Cairncross.—Mr. Hasard is the official expert upon the Commission, but we also have to draw out opinions. There may be other things turning up from time to time that we may wish to have information about. Other persons may express a different opinion from you, and all these things are to be considered as well as the evidence of experts. If Mr. Hasard could see you in the morning then we could have your examination continued to-morrow afternoon.

218. Mr. JOHN McKENZIE.—You look upon your estimate Mr. Manning, as a fair one?—Oh, certainly.

219. The prices are such as you believe the works could be carried out for?—Yes.

220. But are you aware that as a rule estimates have been exceeded in all cases, or pretty nearly in all cases?—Yes, in various cases indeed to a very large extent they have been.

221. In those districts where the drainage has been carried out by the proprietors themselves under the Act of 1863, I believe on an average the excess has been to a very considerable amount?—To a very considerable amount.

222. That is a contingency always to be expected?—Yes, it is a contingency that may be expected. I think most estimates are exceeded.

223. Are you aware on how much on an average these estimates have been exceeded?—No, I could not tell you, but Mr. Penny, your Secretary, can.

Mr. Penny.—I have got a return.

Witness.—I know instances where they exceeded 50 per cent. or more.

224. Mr. JOHN McKENZIE.—And the excesses I presume are relative to the amount of the estimate—for instance an estimate of works that would cost £10,000 might not be exceeded by 50 per cent., while an estimate of works proposed to be carried out at a cost of £100,000 might be exceeded 50 per cent.?—It might, but it all depends on circumstances.

225. But that is the result of past experience—perhaps you cannot say?—No.

Mr. Penny.—In the case of the Inn, which is one of the largest, the excess amounts to 107 per cent.

Mr. JOHN McKENZIE.—As a rule the excess is proportionate to the amount of the estimate.

Mr. Penny.—That is the case.

226. Mr. SMITH.—The larger the estimates the larger the percentage?—Well, I would not expect that. I have no knowledge of that.

227. Mr. JOHN McKENZIE.—There is less risk with a small district than with a large one?—Oh there is less risk with a small district, no doubt of that. Now, talking of estimates, I have completed some very difficult works, sea works. My estimates amounted to £80,000, and my excess on that £80,000 was only £4 11s 11d.

228. But that was not one work, but a number of works?—Oh a number of works.

229. There is another fact which has been ascertained from numerous works which has been carried out both under the Act of 1842 and under the Act of 1863, that large districts are less remunerative than small ones?—That is nearly a general rule. As I told you, now that we are speaking of the comparative value of works done under the Drainage Acts, I find

that the average cost of the whole works proposed here will be £10 11s 3d. per acre, while the drainage of the Rathagan, which is a tributary of the Barrow, cost £8 12s 5d. per acre.

230. But what was the estimate for that?—I don't know. The Upper Inn cost £7 8s 3d. per acre, and there is a little river in the north of Ireland where we drained only 453 acres and that cost £11 7s 1d. per acre, but that is the exception which proves the rule. The Malheur, a tributary of the Shannon, cost £9 4s 1d. per acre, and the Bannockburn cost £9 15s 1d., so that it varies.

Mr. Penny.—The original revised estimate for the Rathagan district was £45,509, and it cost £70,432, or 74 per cent. above the estimate.

231. Mr. BAKER.—Do you interfere with the Duke's weir at Athy; do you take it away altogether?—That will depend on circumstances. I have put in an amount of money which will enable me to take the Duke's weir away whenever I like, and put it back again, that is in other words, to make the sluice capacity of that weir as great that the effect will be the same when a flood occurs, as if there was no weir at all there. That will cost money, and if the owner of the mill wishes it, it might be cheaper to purchase the mill there than to execute these works at Athy.

232. The inclination of the new channel of the river from Athy upwards, is it pretty uniform to the new cut?—Yes. The gradient of inclination of the channel from Athy, or below Athy, from the end of the new cut above Duncally bridge and between that and Bart is fifteen inches in the mile, and then through the new cut I foot 9 inches a mile. We go on then till we get fifteen inches in the mile again, and that brings us up to Monasterevan. Then we have four feet per mile, and two feet nine inches per mile, and so on. In fact we have too much fall, we are embarrassed by it.

233. Lord Cairncross.—Where is it that you are embarrassed by falls?—The upper part of the river, from Portarlinton up. Then below Portarlinton we have nearly three feet in a mile—from Portarlinton to Baythorn Bridge—and we have four feet in the mile from that to Monasterevan.

234. Mr. BAKER.—I suppose from an engineering point of view you consider the fall from Monasterevan down to Athy a very poor one?—Oh, very.

235. Do you know the fall of the Barrow in its present state from Athy down to Carlow?—I do not. Although a fall of fifteen inches in the mile seems to be very trifling, still in a large river like the Barrow there is very great velocity. I would like to get a little more fall there if I could to render the works cheaper, but fifteen inches a mile is a good fall. In the Shannon we have in some places only six inches in the mile, and at others only four inches in the mile.

236. The country through which the Barrow flows—that is the country proposed to be relieved of water—is at present something in the shape of an immense mill-pond, which holds the water in its reservoir and discharges it gradually. Is not that so?—To a certain extent. I have known since this project was put on foot that Mr. Kane, who undertook the actual surveying of the country, and Mr. Fitzgerald, who undertook the actual valuing of it, were unable to proceed with their work, because the lands were flooded up to the mouth of July.

237. But you have made observations for a great number of years there, and know the country well?—I know as a matter of fact that on the Barrow the lands are every year flooded.

238. Can you say how long it takes at present to discharge the floods that are cooped up after an ordinary heavy rainfall?—No; without merely making a guess at it. I would suppose after a heavy rainfall in the valley of the Barrow above Athy the flood might get off the lands in a fortnight or three weeks, or longer according to circumstances.

239. And the works that are now proposed to be done will enable all that water to be discharged in a

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few hours?—Yes. You see although the land is flooded, the rainfall is discharged, the only difference being that in one case it is discharged over the lands, and in the other it is discharged below them. You are not to suppose that because the valley of the Barrow is subjected to flood and under flood for a long time, that there is not a large discharge during those floods right over the land. Now, then, instead of having that discharge over the land, we intend, if this project is successful, to have the discharge under the level of the lands.

239. I would like to know what will be the effect of the accumulated water in that great lake where it cannot now get away quickly, owing to the obstructions coming down so rapidly?—Portion of it won't get away so rapidly as you suppose.

240. My question has reference to the effect which will be produced below your works?—Below the Barrow works—we will say for instance at Curlew, I think it will be just equivalent to what the effect was in the case of the story of the man who put his hand across the source of the Danube.

241. And what would be the effect?—The effect would be nothing. The effect will be the same I say as that produced by the man who, standing at the head of the Danube, put his hand across the spring at its source and said "What will they think of this at Vienna?"

242. I am not quite sure I can follow your simile. What you propose doing is not placing your hand across the river at its source. The obstructions are lower down—near Athy—near the bottom of your district, and by removing these obstructions surely you release an immense volume of water which before that was held back for a certain time until it gradually flowed over the obstructions?—If once during the winter floods you place the Barrow at the level of the Duke's weir and that rain comes and floods the valley of the Barrow, all your lands will be flooded. The whole land for 40,000 or 50,000 acres is now flooded to an extent of probably one foot or two feet. When it floods to that extent and another rainfall comes down and that rainfall is discharged down the Barrow, the only advantage you get in the lower reaches is the effect of the once filling up of that reservoir of 50,000 acres.

243. That is on the assumption that it has filled up at the beginning of the winter and remains filled. I hardly think that is the question. I think the observation of people who live there shows that very likely there is a flood at the beginning of the winter, and unless there is very continuous rainfall, that passes away gradually and the land appears. Then comes another flood and another accumulation—the effect of these barriers which you propose to remove being that these floods are kept in suspension high up the river and gradually give off their water. To my mind the effect of your works will be when the barriers are removed that these floods which take five or six days to run off now, will come down in 5 or 6 hours, and surely the effect of that immense body of water coming down in 5 or 6 hours will be that the banks will be very much more submerged?—Well experience is contrary to that. That is an argument very often used, but the experience on other rivers is just the contrary of that. You will find if you drain the Barrow you will have higher water in the Barrow higher than now. The floods will be more equally distributed during the year, and you will not have a maximum flood probably much greater than you have at present.

244. The bottom width of your channel at Athy is 160 feet?—Yes.

245. Is that at all nearly the same as it now exists in the river?—It is less in some cases.

246. Your estimate, you state, includes dealing with the mill interests only in the district in which the drainage is carried out?—Yes, only in those districts.

Mr. BAUREN.—I suppose if Mr. Manning comes before us again we may have an opportunity in the mean-

time of seeing his report, and some other questions may arise which the Commissioners would like to put to him.

LEED CASTLEBROWN.—I was just going to propose that course.

247. Mr. CANNON.—Do you think that any work carried out on the main body of the river would have any effect in the way of preventing these floods coming? I mean, supposing these accumulations of silt were removed, what would be the effect?—I think, if you have the velocity of the water properly regulated, you will cease to have accumulations of silt, but it will be equally important to prevent that silt from coming down and doing worse.

248. That would have to be looked to at the head of the river?—Yes.

249. Sir JOHN McKENNA.—Do you think the relieving of the heads of floods and confining the waters strictly to the river, will have the effect of diminishing the waterpower of the mills either within the district or below it?—No, I think all the arterial drainage will have the effect of increasing the waterpower of the mills.

250. All mills?—I think so. Where a watermill is lost in its power, is not with respect to its average quantity. The great defect in the watermills in Ireland is, that for several months they have too much supply, and in summer months less than they require. The effect of arterial drainage will certainly be to increase that minimum supply, and by thorough drainage, especially, we get rid of the useless floods which are an inconvenience.

251. You think they will be better off if the supply is better regulated?—Yes, more regular when they will have more water available when they want it most.

252. You would not be relieved by-and-by if by the improved operations, the mills were impeded by the back water?—What occurs now is, that there is an almost constant backwater in the river all along from shoaling channels. The proper way to secure the mill power in my opinion would be by the thorough drainage of all the lands in the catchment, you would then have a continued supply of spring water, so to speak.

253. You have had frequent opportunities of observing the results of arterial drainage?—Frequent.

254. And have you observed climatic effects from it?—That is a very difficult question—the most difficult question that any person could ask me. It is a question rather for a scientist than an engineer.

255. I merely wished to know whether you have formed an opinion?—I have formed an opinion in a general way. There is nothing so difficult as to say that certain results have resulted from certain causes; to say, for instance, that because drainage is made, fewer discharges. I have lived the whole of my life in Ireland, and when I was a boy I knew that the drainage of Ireland was in a very bad state, and I remember well, as certain as the month of July came, we had fever all through the kingdom; we also had ague which has almost entirely disappeared now. I have no accurate knowledge of the subject, but from my own observation I can only say that every improvement of the kind, in the way of drainage, has improved the country.

256. Are you aware of any great districts in Ireland remaining undrained?—The Barrow is one, the Black is another, but they are draining it, and there are some small things to be done down at Lough Nough. The Barrow is the principal one.

257. Do you know the Moy river?—No, I do not.

258. Mr. BAUREN.—In making your calculations of the cost have you included the whole expense of the bridges?—Yes.

259. But is there not a probability of that being got from the county, it being an improvement of county work?—Yes.

260. And to that extent, whatever the improvement would be, your estimate might be reduced?—Before I left Dublin, last week, I got that very thing looked into, and now I have got an account of the

cost of the country bridges, which I can give you when I am next examined.

261. The cost of the Owens river seems to be greatly in excess of the drainage of the other streams and quite above the increased value of the land, might I ask why is that?—I can tell you. The Owens river has only 1,000 acres upon it, and the discharge of the river is very large in proportion to that. The works that are necessary on the Owens river are necessary as much for the improvement of the Little Barrow, where it joins, as for itself. You must take them both as a whole. If you take the Owens by itself, it looks more expensive. It is a river that will give a great deal of trouble in sending down silt. I think it is the worst river in that part of the country.

262. I take it that all the expense of the Owens would fall on the little district that would be benefited by the improvement?—I don't think that would be quite fair towards the Owens. I think the Owens and the Tregue ought to be put together. It would not make much difference—about £11 an acre in the average.

263. But they are quite different streams; the Tregue is not at all a rapid stream, and it does not carry down silt?—No doubt.

Mr. BARN.—They are independent entirely.

264. Lord CASTLEBROUGH.—My questions may, perhaps, go a little over ground that has been already travelled, for, unfortunately, I was not present when Mr. Manning made his first statement. I should just like to ask him one or two things however. (To witness).—Will you just name to me shortly the special points where the present river is obstructed?—I mean the special points of obstruction?—The Duke's weir at Ashy—that is a navigation weir, and we proposed to make an artificial weir there, the effect of which will be the same as if the Duke's weir and the navigation were entirely taken away during a flood. At Bert we cut right flat under the bottom of the river, and then we take a new cut up from Ashy to Monasterven. (Witness pointed out the several new cuts on his map.) Where you see a new cut, it cuts off a little head.

265. I want to know whether the tributaries are included in your estimate, and to what points they are included?—I cannot well tell that. The information to enable me to tell the points to which we go up, was only given to me within the last few days, otherwise I would have had these sections and plans completed.

266. Then the estimate merely refers to the actual arterial drainage of the Barrow itself?—My estimate comprises the drainage of 45,841 acres. My estimate was made before I got this valuation, but it includes everything for the drainage estimated at 45,900 acres.

267. In order to explain this matter we will take one tributary. I happen to know the Strathally river, and Mr. Fitzgerald proposed to include in his valuation about one mile or one mile and a half above the Strathally bridge, but that does not include the bulk of the river—the Borthogue?—I know there is a little extent of land run up there.

268. There is a very large quantity of land there; ten or fifteen thousand acres?—The whole taken in there was, I think, 1,500 acres.

269. Do you think that the proposed drainage would affect the Borthogue as part of the Strathally river?—I could not tell that. I know there is a question about a mill up there, but I have not heard the details. I know the question was considered whether the land above was worth taking the mill, or being abandoned.

270. The reason I ask the question is, that after all the question that will arise, in my opinion, and which I feel is at the root of the whole matter, will be the amount of silt to be charged. I take this river at Strathally, simply because I know it personally, and for that reason alone. If this river is drained up to a certain point at Strathally, and the district above benefits from the arterial drainage of the Barrow, and that the people are able to drain it at a less expense,

or at very small expense, and that they apparently could not have drained it at all unless the Barrow had been drained; don't you think that that ought to be included in the Barrow drainage scheme?—Oh, certainly. If it was worth the proprietors while to drain it after the outlet had been opened, it would be certainly right to include that as part of the scheme.

271. What I am anxious to try to find out is whether the area to be charged can be increased or diminished, as the case may be, and that where a proprietor or proprietors are affected directly by the value of the arterial drainage, that their shoulders should be brought under the burden in the same way as the riparian proprietors?—Certainly. I went over the whole of that district myself a year and a half ago, but I don't think there will be many cases of that kind which would materially affect it as a drainage scheme.

272. In the course of your examination, and in the arrangements you have made for the works, did you consider at all whether any partial scheme of drainage was feasible?—No, I did not consider that at all, because my experience in these matters is this—thus if an engineer takes upon himself to do such a thing as that, and then the works go on, you will find that the engineer in afterwards said, "You promised to give us such and such drainage, and you have not done so." The safest thing is to say, "There is a drainage scheme for you, which, in my judgment, would be successful. I will execute better works for you if you are satisfied with them, but provided that in case of floods you do not make me responsible." I saw Mr. Fitzgerald's evidence in one of the newspapers where he says that the value would be £10,000, which we expect to be realised there on the condition that we should have a four-foot drainage. Well, I believe there will be four feet drainage, except at Ashy. There is a small space there where we are obliged to embark, and we won't have four feet at that point. If there is a question of contribution or taxation afterwards we may be told "Oh, we were promised four feet drainage, and we won't pay a farthing."

Mr. JOHN McKEILIN.—I was under the impression that what Mr. Fitzgerald confined himself to in relation to that four-foot drainage was not to the flooded lands, but to the injured or submerged lands.

Mr. BARN.—That is quite right—it was to those submerged lands he confined himself.

273. The Witness.—The great difficulty in these matters is this—that if you go to reduce your scheme in the beginning, and afterwards find you were wrong in having reduced it, to make it a complete scheme afterwards would be almost impossible.

274. Lord CASTLEBROUGH.—Supposing the reduced works were carried out—that is the original works, but not in their entirety, and that it was hereafter considered necessary or that a popular desire was evinced to carry out the scheme in its entirety, you say it would be almost impossible to do so?—Almost impossible and additionally expensive. It is obvious that once you have the bed of a river dry for excavation, it is better to take out a little more when you have it so, than afterwards to have to go through unwatering, so they call it, again and pumping a second time.

275. The question of mill interest and compensation, I suppose, has been fully gone into?—Yes, the Commissioners have been good enough to ask me to make a general statement in which I included that.

276. There is a Navigation Company which comes in somewhere below Ashy?—Yes.

277. I suppose the works proposed have been contemplated with the view of not interfering with that navigation?—The navigation that interferes with the Barrow is about half a mile below Ashy. It is a crossing and junction of two navigations. They work the navigation in the bed of the river for 180 yards, and they are apprehensive that the sending down of the proposed volume of water will drown them, and that we will make it very difficult for their barges

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to go across. I have considered that question and as far as my judgment goes we will rather improve the navigation than otherwise, because the effect of that volume of water will be rather equalised by the works being carried out. It would be an advantage to the navigation, for they would have a constant level of water in place of an uncertain one. I believe at present the low lands immediately below Athy, down to the next mill and back, are during the floods all covered, and the navigation suffers very much inconvenience from these floods. Well, if we complete the works which we propose there, they will certainly be relieved from all that inconvenience.

277. I would like to know your experience upon one matter with regard to which you perhaps can give me some information—that is where some large drainage works have been carried out and where the water is very rapidly discharged down a particular channel—a new channel, are there not many instances, owing to the water being carried off too soon, where the grasses and the land generally surrounding do not get sufficient saturation; have you heard complaints on that subject?—I believe there were complaints about that, on the Shannon for example. They thought it was better for them to have a moderate saturation by flooding and that the lands would be greatly injured if the floods were removed altogether.

278. I believe there are meadows affected by it in some way?—If I am to trust the newspapers, you have had evidence as to the deterioration year by year along the Barrow. This is a matter known to every one who has been in the district. Those who have had anything to say to the improvement of the country with regard to drainage, know that there is an objection to drain lands, on the ground, that they would not be saturated. I know cases where it is stated:—"Oh, there is cullow land. I am now able to get my £1 or £2 an acre for it, but unfortunately, for five or six years I will get nothing at all for it. Now, will you tell me, with all your science, how we can make that land more profitable?" Well, the engineer's answer is closed at once. But, I don't believe it is merely on that account—there is more in it than that. In years gone by, the Irish farmer thought that any kind of hay would be good enough to give to a cow, but instead of that being the case now, the farmers to-day think that cows should get hay quite as good as that given to horses. I believe that year after year these flooded meadows will not be as valuable, and that it is only on account of the bad farming alone that they have really been so valuable up to this.

279. Mr. BURNES.—Then you think the lower price of hay grown on watered meadows is not owing to the fact that the grasses are worse, but that the general demand for good hay is more, and hence out of demand the bad hay?—I hope they don't put as much value on the bad hay as they used.

280. As I understood your evidence, it is not owing to the deterioration of the grasses that the depreciation in value occurred?—I was speaking on the general question, and the deterioration of the grasses, I merely mentioned as portion of the evidence given on the subject.

281. Lord CAMERON.—Would there be any means of ascertaining the different depths of the river at different points?—Yes, here you will see it in a proof of my report which will be laid before the Commission. From the new cut at Athy, I propose to have a bottom of 160 feet in width, and a depth of 9½ feet.

282. What I was referring to was the present depth of the river at different points?—That is shown on the map.

283. What do you propose to do to remove the silting accumulations from the Owenass?—That is the most difficult thing in the world to settle. It is a matter you cannot generalise. First of all you must deal with the velocity—you must make your water move so that it will carry the silt, but it is almost impossible to do that when the velocity varies between

summer water and winter floods. The real cause is to go to the source of the silt, at the head of the river, where any silt comes from, and to endeavour to prevent that silt coming into the river. Once you get the silt into the river, they are in the habit of putting weirs across it for the purpose of trapping it; but it is quite obvious that when these silt traps are filled up, they are no longer any good. You may clean them out, as we have frequently to do, but then they fill again.

284. Then with regard to the Owenass, what do you intend to do?—To decrease the velocity of the water on the upper reaches.

285. There will be no danger then of silt being eventually deposited lower down?—I am afraid that is a matter of very great anxiety.

286. There is that danger, that the silt brought down by the greater velocity of the water might be carried lower down, and that possibly, eventually, the water might be again stopped?—Yes, and the only thing we will have to do is to endeavour to be most prudent in lessening the velocity where the silt is carried down, at the same time taking care to have sufficient velocity to keep the main channel scoured out. It is a very difficult question, and one that no engineer can be certain to succeed with regard to.

287. Mr. BURNES.—There is a very large quantity of sand coming down from above Rathoolby bridge. I dare say as much as from the Owenass!—Oh yes, there are two rivers then, but the Owenass is a very bad river indeed.

288. Lord CAMERON.—I apprehend that if the works you propose are carried out in their entirety there would only be an infinitesimal danger, except in very high floods, of the water rising above the level of the river and flooding the high-lying lands on each side?—If the scheme I propose be carried out in its entirety, I don't think you will have floods over the lands again, but I won't say that positively.

289. Oh, of course, I qualified what I said, by saying, "Except by exceptional floods"—Yes.

290. Now, I return to that question put to you by Mr. BURNES, about which you gave us the simile with regard to the water coming down at Carlow. I cannot help thinking that there is a good deal in what he says. We have got a case in point before us in the Rathangan drainage district. The Rathangan drainage brings down a very much larger body of water since it was drained than before; however, even suppose the body of water were the same in the first instance, it came down very slowly, but under the improved state of things it now comes down very rapidly?—No doubt, there are matters of degree. Quoting the upper part of the Rathangan, I don't know the length of it; if you cleared out all the drainage of that you would certainly injure the lands below it, but if you take a large river like the Barrow where the entrenchment at Carlow is double what it is at Athy, you will find that the drainage or improvement of these 50,000 acres will not increase the volume of water in any appreciable way at Carlow.

291. In point of fact the outlet at Carlow is sufficiently large to receive the large amount of water that you will send down at once?—We will say there is one thousand gallons going at Carlow before the drainage of the Barrow takes place, and when you drain the Barrow you will find one thousand gallons and one gallon, or something that way, going, which would have no effect.

292. Would not that very one gallon be liable, if the outlet is not sufficient at Carlow, to splash over the edge, and the one gallon would do just as much harm as a greater increase, provided it was multiplied?—Well, no; I think it would not be appreciable—I think you could not measure it.

293. Then it comes to what I stated—that the outlet at Carlow is sufficiently large to take any extra amount of water, no matter what the rapidity of the flow?—The whole matter is one that requires a great deal of consideration. Your lordship has assumed that there is a greater rapidity in the flow.

294. I am assuming that on your own statement.

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You say you would increase the velocity in the river to carry the silt down from the Ovens and the other river, and to increase the velocity all down the Barrow you propose to remove the impediments in the river, and to make a perfect channel. You send down the same water as originally, but it comes down in volume and not in detail—I don't think the result of the damage or improvement of fifty thousand acres on the Barrow will so increase the water so any time that it would be sensible even to an engineer measuring it. As Sir John McKellicott, with reference to the Shannon, where a number of tributaries were drained, there was hardly any appreciable effect upon the different gauges. On this river you will find also, after the drainage, that you will have no appreciable difference. If your leadership will allow me for a moment I may state that within the last five years or so I have put obstructions in the Shannon from one end to the other, and the most extraordinary idea was formed when these obstructions were put up. We have flooded that we relieved the lands from the ordinary floods, but not entirely from the winter floods, for to do that we would require contrivances as we do in the Barrow. But these obstructions have not changed the practical condition of the Shannon at all. They let off the water from the reservoirs. When the floods come down they are impounded in the reservoirs for some time, but there is no difference in the quantity of water, only that you have not the floods.

293. Mr. Barrow.—Is not the case of the Shannon different from the Barrow in this—that in the Shannon you have these lakes which act as reservoirs, which catch the water and retain it, while in the Barrow you have not got them, and in fact what you propose to do is to take away anything in the shape of a reservoir that now exists?—No doubt you are right in that. That is a great deal of difference between the Shannon and the Barrow. But talking of the flood reservoir which you have now, I can assure you that the result in the increased quantity of water will not be appreciable at Curlew or farther down the river.

294. Well, I am sceptical. I must say, I am bound to bow to your superior knowledge, and I can save your evidence well be looked upon with the greatest respect in the country, but allow me to put a case against me where I make an assumption which you know cannot be borne out by the fact. I am going to assume that an inch and a half of rain in the 24 hours has fallen in a district, where it now takes 5 or 6 days to run off in the present state of the river, say 150 hours?—That is  $1\frac{1}{2}$  inches of rain over the whole district takes 5 or 6 hours.

295. The one and a half inches of rain which has fallen is impounded in this lake, it remains there for some time, then there is a flood and it takes 5 days to run off, say 120 hours; you make your drainage, it is finished and that same inch and a half of rain will run off in 20 hours, now then I say that it follows that for every hour 6 times as much rain must run down in the latter instance than in the first—I really would ask you to kindly put that down on paper and I will give you as well as I can, a reply to it. But I think that, without at all intending it, you are assuming a great many mistakes as to times and velocities, and it is very difficult for me to pledge myself to an answer off hand, but kindly give me the particulars on paper and I will do so.

296. Lord Charnsworth.—Has any examination been made below Curlew or at Curlew to measure the fact of there being a sufficient outlet. I entirely bow to your superior knowledge—I may be asking questions not proper to the matter, but to my mind they do bear on the subject—has any examination been made below Curlew as to the power for bearing what I call the increased velocity?—None by me.—It was not considered necessary to examine beyond Athy, but this I say, if there is any apprehension of any damage being done down there, I think it would be very proper—without making an absolute survey, to have a very useful examination made not only at Curlew, but down to New Ross.

299. I was going to suggest that, I don't know what the river is like there—I never was down the river beyond Athy—I have been down the river from New Ross to Waterford, but I have never seen the intermediate river.

300. You stated you consider that in carrying out this scheme in its entirety you would be able to run through the channel of the Barrow the same equal volume of water. What I apprehend you mean is, that the volume of water would be more equal in summer and winter. At present in summer it was very low, and in winter very high—you say you would be able to run it more equally?—I think I would be able to run it more equally.

301. Is that your experience in all those sort of things?—I think so. When you have many floods in a river whose regimen is not settled, you will have floods in one portion and not in another, and by making a design for the whole district, I think you will be able to discharge the waters more regularly and evenly, and without damage.

302. Well I have an instance before me. It is not a large drainage district, but it is a drainage district the works of which have been carried out under the Board of Works, I believe the work has been successful in draining the upper portion of the district, but it has left the lower portion in such a way that the land has been unimproved by want of water. The river is sunk to sixteen feet, and in the summer time it is nothing but a stagnant ditch, while in the winter a heavy volume of water comes down and floods the low-lying lands below the drainage district. This has ceased, and will cease, a good deal of complaint on the lower waters of the Nare, and will probably involve another inquiry such as this. How do you reconcile that fact with your opinion that the water will be more equal in the Barrow?—You require to go into an abstract matter. Take for instance the water falling on the roof of a house. If a quantity of water falls in ten minutes, that water is discharged from the roof of a house in ten minutes, and you have a flood within every ten minutes. If you increase that area, and put grass on it, ten minutes won't flood anything at all, it will take probably ten hours to run off. Then in larger rivers it will take two days or two months to run, and in very large rivers, instead of there being a sudden flood, there will be a rise as in the Ganges and the Mississippi. You will have the effect of the rain all the year so compensated that you will have a gradual rise instead of a flood. If you have a stream on the side of a mountain, and the flood and the rain are contemporaneous, the flooding ceases immediately after the rain, so it won't make any difference.

303. But you say that would not affect a large river?—No.

304. The smaller tributaries coming in would affect the large river, which would by that means get a more equal volume of water?—That depends also on nature. You cannot generalize these questions.

305. But they are questions we must go into, for practically the essence of the Commission is what is the best means of carrying out this work, and of course we naturally have to look at what the effect would be. I may be asking questions which may seem irrelevant, but for information they are valuable to us.—Every case must be decided by an engineer or person who has considered it; and in an endeavour to speak generally to you now, some of my observations may appear to contradict each other. Now, for example, the idea is this.—There is a certain district, and the rain comes simultaneously on the whole of it, but some districts are so high that it won't. Now, the condition of a maximum flood does not at all depend on circumstances run over the whole of it. In the Barrow district, or one of those large districts, if the rainfall is passing from the lower part of it to the upper part the drainage would actually prevent an increase of the flood. If you drain the lower part, and don't drain the upper part, you send down the lower waters before the

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upper waters have time to come down, and you have not so much flood. If, on the contrary, you drain the upper part, and don't drain the lower, you send down a quantity of water which comes after the flood has gone away from the lower, but then a second rain would be very injurious. Therefore it is almost impossible to explain the difference in each case.

306. Then I may safely assume that practically the runoff in the Barrow would be from these works that you would have an equal volume of water throughout the year?—The works would tend to equalize it.

307. And that there would not be in summer time so small a quantity of water—that it would not be lessened to any appreciable extent?—The summer water would not be lessened. For instance, with re-

gard to the main Barrow at Aiky, the design was to uphold the Duke's weir, but put a number of sluices in it that you could take down or put back again.

308. That in point of fact would create the upper portion of the Barrow a sort of reservoir, so to speak?—Yes.

309. And by reason of these sluices you would be able to utilize the water?—Yes.

310. And supposing there was a dry summer, and you utilized the Duke's weir as a reservoir, you would cut off the supply from the lower part?—Oh, no, you would never do that. You would keep up a constant level—a constant supply.

The Commission adjourned till next day.

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## THURSDAY, 25TH JUNE, 1885.

The Commission met at La Touche's Bank premises, Castle-street, Dublin.

Present:—The Right Hon. HENRY BRUES, Vice-Chairman (presiding); Sir JOHN M'KESSIE, K.C.B., Mr. J. A. CARRUT, Mr. HASSARD, C.E., and Mr. HUMPHREY SMITH.

Mr. PRESTY, Secretary, was in attendance.

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Mr. Robert Manning, C.E., further examined.

311. Mr. BRUES.—On the second page of your report, Mr. Manning, you say that the area of the Brooma basin discharged about one cubic foot per acre?—Yes.

312. And is it upon that calculation that you consider 400,000 cubic feet per minute is the greatest quantity that may be expected to pass Aiky bridge per minute?—The data upon which I founded that quantity of 400,000 cubic feet is derived from my own experience in different districts, and one instance was that of the Brooma.

313. Well, how much per acre does that 400,000 cubic feet per minute represent?—One foot, roughly. But if you go to another part of my report I think you will find I say that after a full consideration of all the circumstances, I am of opinion that that 400,000 cubic feet per minute might be reduced to 350,000, but that it is more prudent to take the 400,000.

314. On the third page—the tables—you give the depth in feet?—Yes.

315. Does that mean the depth from the surface of the land?—No, it is the depth from the bottom of the river to the flood line.

316. Sir JOHN M'KESSIE.—From the bottom of the improved river?—Yes, from the bottom of the improved river to the flood line.

317. You said the bottom of the river?—I should have said the bottom of the improved river. In fact, I state this now, that taking the sections at Aiky, I propose that there shall be a bottom width of 100 feet, side slopes one to one, that the depth at greatest flood should be 6 feet 6 inches, and that the gradient should be fifteen inches per mile, which dimensions you will find would discharge a quantity of 411,000 cubic feet in a minute.

318. Mr. BRUES.—In a former report, dated August, 1884, you have given the mileage of the different branches of the new cuts that are to be made, but I don't see that that is given in your last report dated 15th June, 1885. Are we to consider that the mileage given in the report of 1884 is what will be under the works proposed?—Yes. I have given the mileage in my primary report as the length of the Barrow from its source to be forty-seven miles, and I think I give the length at the Aiky to its junction with the Barrow at sixteen miles. But though the length of the Barrow from its source to Aiky is forty-seven miles, the works won't be carried so far more than forty miles, which I think you will see in my primary report.

319. Then, we may take it that the main river will be sunk for 40 miles in length, the tributaries 173 miles, and drains 182?—As nearly as possible.

320. Those original figures stand good?—Yes, those stand good, except in one or two cases in which, probably, I have taken in more length on the original report than, after examination with Mr. Fitzgerald, I thought it necessary to give you. There are one or two instances of that kind, but they are very trivial and make no appreciable difference either in the cost or length.

Mr. BRUES.—Those are the only questions that occur to me at the present time to ask you.

321. The Witness.—Before I leave you, Mr. BRUES, you were kind enough to give me some questions yesterday, and one was—"Assuming that one inch and a half of rain has fallen in 24 hours throughout the catchment basin in its present unimproved state, and with all the obstructions existing in the river to-day, and that it takes 120 hours to run off, and assuming that your works are carried out, and in consequence, the one and a half inches of rain in the 24 hours is run off in 20 hours, will not the result be six times as much water per minute?" If I accept these assumptions, the conclusion is manifest—if you discharge the same quantity of water in one-sixth the time, you will be discharging, in each moment, six times the quantity of water originally discharged. There is no doubt at all about that, but I doubt the assumptions—at least, I don't doubt them, but I am sure the assumptions are not consistent with my experience of such matters. First of all you assumed that a fall of an inch and a half of rain in 24 hours will be run off in 20 hours—that is a complete impossibility; in fact, according to that, it would run off quicker than it fell. That could not be so. Then, if we consider that practically, in regard to drainage, the whole quantity of water during the year is not much increased by the drainage, it will be merely a question of evaporation which is necessary to be dealt with in water supply, and, of course, the actual quantity of water you have to drink, but, practically you may take it, as probably, Mr. Hassard will tell you, that there will be no difference after the drainage in the total quantity of water. Then, if that volume of water is discharged six times as fast as now, it would follow from that, that you would discharge the whole floods of the Barrow in two months out of the twelve, and there would be none for the other ten months. I don't think that is what you mean, however. The difficulty is during flood time, and if you do that, then what

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would be the consequence? I have stated that the discharge of the Barrow will be 400,000 cubic feet per minute, and you may take that to be very likely what it is—from 350,000 to 400,000, but we will take it at even less, say 300,000; now, if you sent that down six times quicker, we would have, instead of 300,000, 1,800,000 cubic feet per minute, which is much greater than the present discharge of the river Shannon, much larger river than the Barrow. And, I may state now distinctly as a matter of fact, that if the Barrow proprietors got an unlimited amount of money, and had perfect free will to execute any works of any magnitude they liked, it would, in my opinion, be a perfect impossibility that they could discharge that quantity, or anything like that quantity. I don't like to make such statements as these without having properly considered the matter, and last night I took the trouble of going over the data as given by you and accepted it. I went further and supposed that that  $1\frac{1}{2}$  inches of rain would have simultaneous effect on all the tributaries, and I found that if we admit such a proposition as that, the effect of the drainage would be probably to increase the discharge at Athy to about 50 per cent and probably the increased discharge at the junction of the Nore to about 28 per cent, but that is on the assumption that the effects of the  $1\frac{1}{2}$  inches of rainfall were felt simultaneously at Athy, and that every river sends its water from the remote part of the catchment area in the same time as the tributaries near it. Now, as to the velocity—we take forty-seven miles as the length from the top of the Barrow to Athy, and I don't think any engineer would like to send water at a greater velocity than about 2½ miles an hour—we have been usually in the habit of sending water at a velocity of about 200 feet in a minute. I have in the Barrow proposed to send the maximum of four feet in a second. If you take the quantity of water flowing from the top of the Barrow for forty-seven miles, and send it at the rate of three miles per hour, it will take nineteen hours to send that water down to Athy. Every other portion of the district will be sending it in proportion to its distance from its starting point, and they will not all arrive together—it is impossible that you can calculate upon a simultaneous arrival of the water from all parts of the district at any discharging point you could name. However, on the other hand it is perfectly true that after long continued rain—after different distributions of rain—you will have a second flood occurring in the lower part of the district meeting the flood that has taken some nineteen or twenty hours to arrive at Athy, and so the two meeting together, in that case there will be a simultaneous discharge, so to speak. I can only say, with regard to that, that that is one of those experiences that only occur once in twenty or thirty years—it may occur, but if it did, I have guarded myself against it. If such a thing did occur I have no way to state my deliberate opinion that no works you could put in the Barrow would have the slightest effect in the discharge, more than at present. Because, the conditions, or whatever you can afford to do in the Barrow, are such a trivial matter that the lands would be flooded long before, and the discharge would go on whether there was a river there or not. In fact, I should also mention that the real measure of the increase of the discharge by relief of lands is the quantity of lands that are relieved and the depth at which the water flows over them. In fact, to go to the very opposite side of the question, I now tell you theoretically that the drainage of one single acre of land in a catchment may cause an increase of the quantity of water discharged at the discharging point, and the whole question is one of degree—will that be the one-tenth part of an inch or will it be two inches or what?

Mr. BAKER.—Thanks for the fulness with which you have answered my question, but of course that very fulness prevents my being able to take in the whole until I see it in print.

322. Mr. BAKER.—There is one thing which I think

claimed your attention, Mr. Manning—the Overcan, isn't that a very quick flowing stream down half-way to Cuckoo, before the upper part of the Triogue is come to?—It is no doubt, but I could not give a more specific answer without going into the question carefully—as to the land and all the circumstances.

323. I know from personal observation that that is the case—that it is down at present generally a day or a day and a half before the upper floods come down, because the upper flood of the Barrow comes through a very crooked district, and with not at all the same fall as there is down the Overcan; and the Triogue also comes through a level part of the country, so that the flow of the Overcan would be discharged completely before the other waters came down.—Yes, and in consequence of that part of the country being so steep instead of calculating one foot per acre per minute, I have taken for the upper part of the six miles under Slieve Bloom, no less a quantity than 3 feet or three times the quantity I have put down for the river Barrow itself.

324. Mr. BAKER.—And is that increased discharge from these upper lands taken into calculation in estimating the 400,000 feet per minute?—Certainly. It is a most extraordinary thing. I have seen it over and over again and it puzzled me very much in my early days—I was wondering where all the waters went to. Suppose you had 1,000 acres of land discharging at the rate of 3 feet per minute; another 500 acres discharging at one; and a third, 500 acres discharging at  $\frac{1}{2}$ , you would imagine by making a rule of three sum that the whole of that quantity would be sent down to the discharging point together; not at all—they won't arrive at the same time and they won't all have their maximum at the discharging point together.

325. Sir JOHN McKEEVER.—Would not all that depend upon the direction of the rainfall?—Certainly.

326. In fact the whole question depends upon the degree of saturation of the lands and the duration of the rainfall.—Not only that, but also upon the size and shape of the catchment and the nature of the catchment.

327. But these are the main points?—Yes.

Mr. HARRARD, C.E.—Does any record exist of the maximum discharge of the river now at Athy—in its present condition?—Not that I am aware of.

328. There is a mill at Athy—a millowner's weir?—Yes.

329. Would it be possible, do you think, to get any approximate information upon that subject?—I do not think that it would. I have had a good deal of experience myself in the measuring of flood discharges, and if I were down at the Barrow to-morrow, and had a section of that weir, and that there was a flood going over it, I would find very great difficulty in keeping any record of the quantity of water passing over.

330. Why—is it not a level weir?—No, it is not level, it is oblique to the channel, and I believe there would be back water in one of these long floods.

331. Which would drown the weir in fact?—Which would drown the weir. I have occasionally made observations of the kind, but I have always checked them by some other means, such as the discharge through a bridge, and even taking the discharge through a bridge, you will find it very difficult to come to an accurate result without very complete observation, and very accurate sections.

332. I know that well, but any information of the kind would be very useful, if we could get it?—I think that as far as that is concerned we have very good information, approximately from other data.

333. It would give us the equality of the river, below the points where the main drainages would come?—I think that any observation of the quantity of water, by measurement or calculation, on any part of the Barrow now, would be very difficult of accomplishment; the sections are not uniform.

334. But, if there is any weir at all in a tolerably

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good state of repair, that we could get the approximate quantity of water passing over it, would give us a very good idea of the discharge—it would, but I should prefer going on other data altogether. If I knew the calculations made in a place where the natural conditions do not much vary, I would take my data from that particular case, and not from any theoretical calculations. Now, we have that in the river Brooma, which is a very instructive case. That river was drained some thirty-five years ago, and in the year 1851 the engineer in charge of it reported that he had partially executed the works, and that he had drained about 8,747 acres.

335. What is the whole drainage?—The total drainage when completely finished, was 11,908 acres.

336. Is that the whole of the drainage?—Yes; that is the whole of the drainage when it was completed.

337. I thought it was a larger undertaking than that?—No, that was all. Well, in that year, 1851, there was a very great rainfall, and not only a great rainfall, but the quantity of rain in a short time was very great. He observed then that the discharge from 285,000 acres was 267,477 cubic feet in the minute.

338. From 285,000 acres—then that is the drainage area?—No, that is the area of the catchment.

339. And the 11,908 acres is the area of the improved lands?—Yes, I mentioned the area of the improved lands to show you what the consequences would be if you increased that area of 8,747 to 11,908, that would be the increase after taking away the reservoir, so to speak. That discharge amounted to  $\frac{1}{10}$  of a cubic foot per minute.

340. And have you any record of the rainfall?—The rainfall was 52·46.

341. That is the year's rainfall?—I have the rainfall here.

342. I mean the rainfall previous to that particular flood?—Yes, I have it here.

343. That was in 1851, I think you said?—Yes (after examining papers), I find I have not that record here. I think it was an inch and a half rainfall, but I can give that particularly, and I will send it in to Mr. Penny. Well, the next greatest flood that occurred in the Brooma was the very next year which gave a discharge of 238,000 cubic feet in the minute, and the next flood that occurred was the great flood of 1877, the results of which, in the Brooma drainage, I have given in my report. That was a wonderfully great flood, and very generally felt.

344. That is the Lough Neagh drainage?—Yes. We find that though 29·95 inches of rain fell in the year, the maximum quantity of water discharged was 230,000 cubic feet per minute, which is as against 267,000 cubic feet a few years before.

345. Did they take into consideration, when making that calculation, the water dammed up in the lake—in Lough Neagh?—I gave no guarantee for Lough Neagh.

346. I thought you gave 230,000 cubic feet per minute as the maximum discharge there in 1877?—No, I am dealing with the discharge of the Brooma river all through. The next great flood gave a discharge of 206,000 cubic feet per minute, and that occurred in 1876.

347. Mr. Burns.—That is in the Brooma, still?—Yes. There have been daily observations made in that river, and for thirty years there never has been such a flood as I have mentioned; so that clearly shows you that when the works were only partially done in the year 1851, you had a greater discharge than ever since they have been totally completed, and an additional quantity of lands relieved. Now, the area of the Brooma basin being 285,000 acres, and the area of the Barrow basin being 407,700 acres, the discharge of the Barrow should be somewhat less, being the larger district, than that of the Brooma; but I have taken it a little over the maximum flood that was ever observed on the Brooma, and though I take this, for the different reasons I explained to the Commission yesterday, I say it is very likely that the dis-

charge will not be more than 340,000 cubic feet per minute. If it was a matter of money, not to stop the drainage from going on, I would not object to take the discharge of the Barrow district at Athy at 300,000 cubic feet per minute, that is, if it was a question of whether the works would go on or not. I would say, take it at 300,000 cubic feet per minute, but remember what I told you of these extraordinary floods.

348. Mr. HARRISON, C.E.—One cubic foot per acre per minute is equal to 40 of an inch of rain falling off all the ground in 24 hours!—The way I have taken it is this—that 4 inches of rain will give you 10 cubic feet per acre per minute for 24 hours, which is very nearly equivalent to what you say.

349. The velocity of the water at Athy—calculating upon your figures of width and depth of channel, with slopes one to one, I made 240 feet per minute?—Probably, I said that I endeavoured to make the whole of it 4 feet per second.

350. You have the slopes one to one?—I have made the slopes one to one, but it does not make much difference in the discharge, after all.

351. No, but it would make considerable difference as regards maintenance?—As regards maintenance, it might a little, but the greater portion of the channel from Athy to Bert is rock.

352. Then, in rock, it would not signify so much, but in ordinary practice, my experience is, that with steeper slopes than two to one are not at all safe—I have found in my experience, that slopes of one to one did stand, and in other cases that a slope of two to one would not stand. These are matters of detail which must be looked to carefully by the engineer who has charge of the works.

353. I know that in the Rathangan district the slopes were not at one to one by my predecessor, and we had to alter them?—But what was the velocity there, might I ask?

354. It was not so great as you have here?—I don't think very much.

355. No, it was not, indeed. I would certainly say—make your channel wider and your slopes less steep?—No, Sir John McKerlie said yesterday, and I agreed with him; but as I have already observed, that is a matter of detail that would, probably, require to be looked into for every three or four miles.

356. Exceptional storms might occur, for instance, in this way?—Supposing that the drainage was divided into two districts, upper and lower, it takes about 16 hours for the water to run, at three miles an hour, from the upper end to the lower, then it would take about eight hours for it to get down about halfway, supposing it flowed with equal velocity the whole distance?—Yes.

357. You might have at the rate of 1½ inches of rain running off the ground for the whole of the area in the first instance, and the lower half would have gone?—Partially, it would have gone.

358. I mean partially—but then if a second storm came on you would have the whole quantity—what comes from the lower portion would meet what is coming down from the upper?—I have stated in my direct evidence to the Chairman, pretty much what you say now. I don't like to put myself to saying the whole quantity coming down, but I stated that any works you can execute on the Barrow will not have the slightest effect on that.

359. No doubt these rare and exceptional storms do occur at long intervals of time, and, generally speaking, I agree with you that it is not worth while making the works to meet a case of the kind?—Not only that, but suppose you have a flood down a street, first of all it will be carried down in the water tables and keep your street dry, but suppose you said that flood down quicker, and supposing you have a flood two or three feet deep, what wall it cut about your water tables—it will not make an infinitesimal difference in the quantity to be discharged. The fact is that in the unimproved districts floods will go on until you fill up your reservoir area

and when after that a second flood comes on, it is discharged as quick as it goes.

360. Your impending spaces all being filled?—Yes; and if the flood does not rise further it will probably continue for a day or two, and during that time we will have the maximum discharge, whether the river is impeded or not.

361. There exists, I know—and I asked you to bring the book for the information of the Committee—there are in reports on the Shannon drainage several instances in which drainage areas are quoted, and the maximum discharges given. Some of these cases I know to be very similar to the Barrow, and I think it might be satisfactory to mention them?—I have the book here, and will quote some of these cases to which you refer.

362. Mr. BRUCE.—Mr. Manning mentioned the case of the Shannon at one of our former sittings as an example of what might occur in this case, and I asked him to consider whether there was not this variation in the Shannon—that there were large lakes down its course which act as compensating reservoirs, and that in the case of the Barrow there were not such.

The Witness.—Yes, and I quite agreed with you that as far as the lakes were concerned that would make a difference; but, to return to that Brown river again—on which I in fact ground a great deal of what I say—what do we find? The Brown is a tributary of the Shannon at Shannon Bridge, and comes into the Shannon at a place where there is no reservoir—in fact there are weir at both ends of it, and the gauges show that there is no material change upon the height of the water. Mr. HARRARD has asked me to give some of the discharges of rivers within and contiguous to the basin of the Shannon. There is the Woodford river, the area is 101,453 acres, and the discharge per acre per minute was 1.12. That was ascertained by actual measurement. It drains the northern slopes of the mountains east of Lough Allen.

363. Mr. HARRARD.—There are one or two small lakes there, but only very small ones, and then, to counterbalance that, the stream is a very rapid one, flowing from about 2,250 feet above the sea, and coming down with very great velocity.

Sir JOHN McKEEVER.—It is a very small district, though.

Mr. HARRARD.—Oh, 100,000 acres.

364. The Witness.—One-fourth the size of the Barrow.

365. Mr. HARRARD.—Now will you give us the Upper Erne district adjoining that?—The Upper Erne is 360,000 acres, and the discharge ascertained from actual measurement was 0.83. Another river, the Inny—the area of the rain basin is 231,116 acres, and the discharge is 0.86 cubic feet per acre per minute.

366. There are some lakes upon that drainage work?—Yes—there are lakes upon it.

367. Sir JOHN McKEEVER.—And that I fancy is only the old district?—Yes, that is the old district.

368. But then there is the new district—the upper district from about Lough Erne?—Yes, that district of the Inny which we now speak of refers to matters before the improvement of the upper Inny, or making those lakes into compensating reservoirs and draining a large portion of the lands in the other district. In fact the question of compensating by a reservoir or by an extended catchment, is a very extensive one indeed. In France they have paid very particular attention to this entire subject. I have seen a flood on the Seine which rose 16 feet over the ordinary level of the river, and 10 or 12 miles above Paris the whole country was one sea. In France the control of the watershed is under Government, and for a number of years they have had observations made on every stream in that watershed with bench marks along, so that they are able now to actually telegraph a flood—when it will come at different points of the river, and not only that, but the height of that flood and the time it will

arrive at. So particular were they and so anxious to improve the drainage areas of the Seine, the Marne and the Yonne, they got a commission appointed to propose a control of the floods by the erection of compensating reservoirs. The engineers made what they term an *assessing report*,—or what we would call a preliminary report,—and the resolution they came to was that the enormous amount of money required, to be productive of the slightest good, put the thing out of the question, and that even if that money was expended, it would not have the slightest effect down the river immediately above Paris. So that the whole question of the efficacy on the coefficient of the rainfall in a large district, is a subject that cannot be generalised—you must go to every particular district and do as well as you can with it, according to your knowledge. In India they have done the same thing. I have recently been investigating the coefficient K as they call it, of the proportional discharge of a river during floods, and to tell you the truth, I think there is a great deal more knowledge required before they can get an accurate coefficient. I have been working at it, I suppose 25 years myself, and I have got a little way on, but have yet a great deal to learn. Will some other districts here—shall I mention them?

Sir JOHN McKEEVER.—Mr. HARRARD, are you satisfied, may I ask, with the amount of the discharge of the river provided for by Mr. Manning?

Mr. HARRARD.—Well, I would like to see the locality for myself before answering that question.

369. The Witness.—I can give you forty, fifty, or one hundred other cases of river discharges. I suppose I need only give you the drainage areas and the discharges—I need not mention their names.

370. Mr. HARRARD.—Oh, if you give them at all, you had better mention the names, because it may affect the question very materially—the locality?—Very well, there is the Lough Salween district, drainage area 2,425 acres, coefficient 1.03.

371. Lough Salween—where is that?—In the county Mayo, the Drumoran district, which is in the county Sligo, and one of those that I reported on myself, and made the surveys; drainage area 3,260 acres, discharge 3.60.

372. I don't think these small ones are of much importance, if the drainage area was steep, and the area small, the discharge would be very large as compared with the Barrow district?—Very well, we will pass to the largest ones. Ballinamore and Ballyconnell district, 90,000 acres; coefficient 1.13. Then there is the Fergus district in the county Clare, 104,360 acres; discharge 0.76.

373. Sir JOHN McKEEVER.—That is a very peculiar district you know, not only has it lakes, but there is a great deal of underground discharge?—Yes, a great deal.

374. There is a great deal of subterraneous discharge there, so that really that affords no example at all?—Yes, I was there last week, and I can quite confirm what you say. I have seen rivers emerging out of these swallow-holes, and then disappear again. Then we have the Boyne district, 304,139 acres, and a discharge of 0.69.

Sir JOHN McKEEVER.—That is a very fair example for comparison.

375. The Witness.—Next I see Lough Oughter and Gorman, counties Carran and Longford, in the western district, 360,000 acres, and discharge 0.83. Then the Lough Corrib district, county Galway, 780,080 acres, with a discharge of 0.83.

376. Mr. BRUCE.—But they have got a large reservoir there too?—Yes. The area of the Lough Erne district is 974,000 acres, and the discharge is 0.67, and the particulars of Lough Neagh district I have already given.

377. Sir JOHN McKEEVER.—Those figures are not derived from your own calculation—they are from old records I take it?—Yes, they all appeared in Mr. Mulvaney's evidence before the Lords in 1852.

378. Then would it not be better to give Lough

June 15, 1884.]

Mr. Robert  
Manning, c/o.

June 21, 1865.  
 Mr. Robert  
 Manning, &c.

Naugh as stated in these records, about—You, the area was at that time, 411,520 acres, and the coefficient 0.51. I have given the particulars; I don't know whether they are the same in the report I submitted to the Commission.

Sir JOHN M'KENZIE.—It probably varies very much—it probably does a good deal at least.

379. Mr. BRIDGES.—Are these figures the maximum?—These are the maximum discharges observed.

380. And during what period or length of time were the observations carried on?—It varies. During the time that the arterial drainage of Ireland was being carried out numerous observations were made, and in the year 1833 these were the maximum results observed in each of the districts I have named.

Mr. HARRARD.—1852 was a very wet year?

Sir JOHN M'KENZIE.—The greatest flood that occurred in Ireland—known at all events during the present century—was in January, 1863.

381. The Witness.—There was another in 1861.

Sir JOHN M'KENZIE.—But the largest flood recorded at all events was that of January, 1863.

Mr. HARRARD.—At Manchester in 1851 they had 6½ inches of rainfall in five days—at Woodstock, near Dublin, about two years ago, in the Dodder valley, where the Rathfriland waterworks are, we had 5.19 inches of rainfall in eighteen hours.

382. The Witness.—Mr. Symonds, the recorder of rainfall, whom we all know, has, after a number of years' experience, stated his opinion that engineers must sooner or later make up their minds to deal with a maximum rainfall of four inches in the day. From all his experience throughout the kingdom he says you will have sooner or later to deal with three to four inches of rainfall a day.

Mr. HARRARD.—You may have that in a very small area, but such a rainfall over a large area is quite unheard of.

383. The Witness.—When I was designing work in the county Sligo in 1847 I took care to ascertain the quantity of rainfall first from Mr. Cooper's autumner there, and as I now remember the figures at two over two inches. I went from that to the county Leitrim, and Mr. Tottenham had a rain gauge up in that part of the county, and he told me that it registered 2 inches, and that the gauge being open at the top, the rain splashed out on the floor, and he did not know how much more fell. That was in the year 1847; and it was such experience as that that made me provide for a discharge of three feet and a half per acre in those western districts, and you will see by my report that I was perfectly right in that.

384. Mr. HARRARD.—In the upper portions of this district I believe you have taken in some cases three feet per acre per minute?—I have.

Sir JOHN M'KENZIE.—Will you tell us, Mr. HARRARD, whether you think sufficient provision has been made for the discharge in Mr. Manning's estimate?

385. Mr. HARRARD.—As far as I can form an opinion at present I think the channel provided by Mr. Manning would suffice.

386. The Witness.—In looking over those channels that I have provided, Mr. HARRARD, you will find in some cases that I have provided a larger channel than may seem warranted by the data I have given, but the question there is one of velocity.

Mr. HARRARD.—I would rather myself make the channels a little larger and the velocity a little less, because I think anything over 300 feet per minute is rather dangerous velocity. You may have a little less velocity, but it will be less destructive and would be less expensive.

Mr. BRIDGES.—Have you completely gone over the ground you would like to go over, Mr. HARRARD, with the witness?

Mr. HARRARD.—I think so, I would just like to see the district and the rivers before I form any more definite opinion.

\*386. Mr. BRIDGES.—(To witness).—Is there one uniform formula of calculation which governs all these figures and results of the different drainage districts which you

have quoted for us?—These cannot be called calculations, they are mere observations. The first step is to ascertain the limits of the watershed and area of the land which contributes water to the river; that is ascertained by a careful examination, if necessary, on the ground with the Ordnance map and levels marked upon that map. You then by that means obtain—in this case—the 400,000 acres that I speak of as the catchment of the Barrow, and you have then to start with a known dimension of river catchment and a known form. You can then calculate theoretically the quantity of water that that will discharge or is actually discharging at the time, or if you have not that, you can have actual observation of the velocity by floats, and frequently you have a check upon all this by comparing the discharge as going through an open channel, with the discharge flowing over a weir in the same channel, to measure which there are technical methods of calculation, but the results obtained in all these cases may be given as observations of actual facts within the capability and cleverness of the man who makes the observations.

387. Partly by theoretical calculation of the area of rainfall and partly by the observation of floats, worked on the water at a point of discharge?—Either way will do.

388. But you cannot tell as which of these means of calculation or means of observation were adopted in the instances that you have given us?—No, I cannot.

Sir JOHN M'KENZIE.—I think most of these observations were from the discharge through bridges.

389. The Witness.—Whenever an engineer can get at a weir of known dimensions and height it is the best means, in my mind, of gauging the quantity of water. A bridge is another good means, if you are moderately well skilled in hydraulics, but it is not so easy a matter as most people think, to go to a bridge and tell the quantity of water going through it. It must be done with very great care and nicety.

Sir JOHN M'KENZIE.—You are right, but I know for instance in the case of the Browne river the discharge was calculated at Robson's bridge, which was a very complete bridge with very complete sections.

390. The Witness.—That may be so, but I am aware that in that district there was a large cutting—a very well executed rock cutting, the dimensions of which were known, and gauges were put up so as to tell the actual height of water and the fall, and they calculated the discharge from the usual formula. As Sir John M'Kenzie says, they may have checked that—probably they did, though I don't know that as a matter of fact—by the discharge through a neighbouring bridge.

391. Mr. BRIDGES.—The difficulty, it appears to me, in such a case is that unless you have the means of perfect calculation, you must be thrown back to a large extent on estimating rather than calculation. These things are done with far more accuracy, as far as the subject will permit of, than you have any idea of. I may mention the very last case—Mr. Bateman, who is a past President of the Institute of Civil Engineers, was engaged to make a survey of the great South American river, the Parana, and he sent out Mr. Levey, who has published a book on hydraulics of great rivers. That gentleman observed the velocity across that river; he ascertained the area velocity, and he did what was more—a very difficult thing to perform—he ascertained the surface inclination of that enormous river, and found it to be  $\frac{1}{100}$  part of an inch in a mile. That seems to be very slow work. But within the last month I took the data which he gave, and from pure theory, I found that the fall I would have calculated as the theoretical one, would have just differed from Mr. Levey's fall by one eighth of an inch per mile—a quantity which could not be observed.

392. In your calculations do you take the velocity of water on the bottom to be the same as the velocity of the water on the surface?—Oh, certainly not; the mean velocity is what we take. All the *Xs* and *Ys*

that enable a person on reach in these hydraulic formulae, have been a number of years ago, given to the English public in general terms by Mr. Tredgold, and his statement is this—"that the velocity of the surface of a river is very nearly a mean proportional between the fall in two miles and the mean hydraulic depth, and the mean velocity of the whole flowing water is still more nearly one-tenth of that proportional." These are, in general terms, the formulae which we have been in the habit of using, and I mentioned the matter in my report.

393. Sir JOHN McKEERIN.—Going back to the general question—at the foot of the district—at the estuary of the district there is a weir, at Alby 1—Yes.

394. Do you propose to lower that, or to remove it, or what?—What I propose to do with the weir at Alby is this—to construct, if necessary, a set of sluices in it that would be tantamount to removing it altogether, and if the miller then likes to take a reasonable compensation for his mill; that it is a matter of public policy, and that it will do him no harm to destroy it, there will be no objection to paying him a money compensation; but I have put into my estimate a sum of money which renders me wholly independent of the miller altogether.

395. Which will cover it under any circumstances?—Under any circumstances.

396. The putting in sluices will not be injurious to the drainage of the river—the discharge from the new one?—No; the area of the sluices will be equal to the area of the channel.

397. But then, that of course entails the necessity of having a superintendent at the sluices—an annual cost?—Yes.

398. Mr. HARRARD.—Is that Mr. Harrard's mill that you speak of?—Yes. It is a very fine building, and was useful in its time, but the waterpower of the mill is not good.

399. Sir JOHN McKEERIN.—Are there other mills?—There are a few mills. I have the particulars of all the mills, but there are only one or two in which a weaving business is carried on. There are some trifling mills about Mountinlick, and there is a factory there, but these mills would be dealt with by adapting them to the new state of things, without injuring them.

400. There is a great extent of bog in the upper part of the district upon these two tributaries, the Philpstown tributary and the Coshine?—There is a good deal of bog there, and a great deal of poor, flooded calow land up the Coshine river, and in fact, a large portion of it embanked.

401. But, however, a great portion of it is bog; not it is a vast extent of bog, part, in fact, of the Bog of Allen?—Yes.

402. And will not the effect of the works be to considerably lower the level of the water adjoining these bogs?—Yes.

403. The working of the bogs is dependent upon the level of the water?—Yes.

404. And will not the lowering of the water through the works render possible the excavating or cutting out of the bogs to a considerably greater depth?—Certainly.

405. Perhaps the matter does not properly belong to your department, but would not that appear to be conferring a very considerable additional value upon these bogs, supposing even they are of little value now?—Yes. But the question will become a very perplexing one in some years, in this way—that after they have cut the level of the bog down they will complain that the drainage has failed, forgetting that they have lowered the level at which we originally started. I have known various cases in which persons have complained, where really it has occurred from cutting away bog—for instance, in the Lough Neagh district that occurred.

406. The result, at least, is dependent upon the demand for turf?—Yes.

407. And with such a vast extent of bog it would be a very long time before it is required, but the time

may come when it will be more valuable, I believe?—Yes.

Sir JOHN McKEERIN.—The reason I ask the question is, that a great deal of that bog was taken in by former valuers— isn't that so Mr. Penny?

Mr. PENNY.—Yes, the bogs were surveyed, but no valuation was made.

Sir JOHN McKEERIN.—But surely there was a certain amount charged upon them?

Mr. PENNY.—There were low margins of the bogs which it was intended to change.

Mr. HARRARD.—The area that Mr. Fitzgerald gives now is certainly less than I have seen in former reports.

Sir JOHN McKEERIN.—That is what causes the difference, some bogs are struck out. These bogs hold a good deal of water, they take some time to fill up, or become thoroughly saturated, and in that way act to a great extent as compensating reservoirs. They give off the water slowly too.

Mr. HARRARD.—They are sponges, in fact. Mr. Fitzgerald gives the area as 45,841 acres flooded and injured lands, and according to my recollection there was considerably more than that formerly.

408. The Witness.—If you look at my primary report, you will find that I made a rough guess of it at 50,000 acres.

409. Have you that passage in your report?—Yes, here it is—"being anxious, however, to furnish all the information I can, I have conducted a survey, previously completed, more than thirty years ago, and I think I cannot be wrong in estimating the total area to be drained at 50,000 acres, and the annual increase in value of the lands, if so improved, at £17,000."

Mr. HARRARD.—And here is a report in which I have it given at 52,000 acres.

410. The Witness.—That is a report of Mr. Bower's I think.

Mr. HARRARD.—Yes, and he puts it at 55,000 acres.

Mr. PENNY.—That was the estimated area prior to the Rathangan drainage being carried out, though.

411. Mr. BUTLER.—Mr. Manning, I should like to ask you whether you have in any case provided for the necessity of concreting the banks of the river in any places where there is sand and gravel?—No, I have made no such provision.

Mr. HARRARD.—From my experience of the adjoining district, the Rathangan district, where there were those calloves, which you might compare with silt and sand, and gravel slopes of one to one, were not sufficient at all. They would require to be much flatter, and would probably require protection as well.

Mr. BUTLER.—It is certainly within my experience of the little works that have been done on the Lerr, that they had to concrete the banks there for two or three miles.

Mr. HARRARD.—I did that, and when they were objected to I told Mr. Hamilton, the Duke of Leinster's agent, that the inclinations were so steep that the slopes of one to one provided would be totally inadequate to resist the floods. They were afraid to incur any further expense at the time, but the result was they had to carry out that concreting protection for a great distance afterwards.

Mr. BUTLER.—Is there no fear that in some part of the Barrow's course the same difficulty may arise and the same failure?

412. The Witness.—No doubt, but I have not gone over every portion of the river's course to see where that difficulty would arise. But no doubt you will have difficulty with the banks in many places. The estimate, however, so far as I know, will provide for all contingencies.

413. Mr. HARRARD.—You have a sufficient sum down for contingencies to cover all that?—Yes. I think I put in 10 per cent. for contingencies, but I can tell you (after looking at estimates) I find I put down 12 per cent. for contingencies. I think that the destruction of banks is very often due to the direction of the stream not being parallel with them.

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Mr. Robert Manning, C.E.

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 Mr Robert  
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414. Yes, not being straight—Yes, and the difficulty has now been found even in straight channels, that you have not that parallelism in the throats of a flood that we all expected, and that, in fact, as the French say, they go *par secunda*, that is, they go with

little jumps. If you have not a very direct and uniform channel, you have direct action on the banks.

The Commission adjourned to 8th July, at Philipstown.

July 8, 1855

### WEDNESDAY, JULY 8TH, 1855.

The Commission met at the Courthouse, Philipstown, King's County, pursuant to public advertisement.

Present:—The Right Hon. HENRY BRUCE, Vice-Chairman (presiding); Sir JOHN McKEILLIE, K.C.B., Mr. HARRARD, C.B., Mr. HUMPHREY SMITH, and Mr. CASHBY.

Mr. PENNY, Secretary, was in attendance.

Mr. Peter R.  
 Garvey.

Mr. BRUCE, opening the proceedings, said:—In the absence of Lord Castletown, the Chairman of this Commission, who has been unavoidably detained in London, I have to say that the Commission meets here for the purpose of receiving any evidence which may be offered to it with regard to the object of this inquiry, and that is the drainage of the district traversed by the river Barrow and its tributaries, and the improvements which may be made by such drainage upon the lands which are now injured by water. The Commissioners will be glad to hear any evidence put before them by proprietors or occupiers of these lands. Public notice has been given of this meeting, and we are now ready to hear any evidence which may be offered to us.

415. Mr. Peter R. Garvey.—Mr. Chairman, I ask the indulgence of the other persons who may be here as witnesses, in order that I may be permitted to give some evidence first, being anxious, sir, to catch a train at Fartullington. I wish to make a few observations on behalf of the Earl of Rosse, whose agent I am. In the valuation schedule you will see the Earl of Rosse's name down for the townlands of Cellegagh and Omeavon, which belong to him. Now, I desire to ask the Commissioners how it is proposed that the drainage charge should be paid, if this work be carried out? There are two matters I wish to lay before the Commissioners—the first is with regard to the charge upon the lands, and the next has reference to the proposed increased value. Now, with regard to the charge upon the lands, if the drainage works which are contemplated be carried out—these lands are situated on a tributary, and it is quite true that both townlands are injured to a very great extent by the flooding, but these lands have recently been the subject of consideration in the Land Commission Court, the Sub-Commissioners have viewed them in their flooded and present aspect, and the rents have been regulated accordingly. I, therefore, on the part of the landlord object to any charge being made against the landlord in respect of these lands, should they be improved by drainage.

Mr. BRUCE.—Well, I think I can give an answer to your query, namely that the very question you put to us is one of the objects of our inquiry. The warrant of the Lord Lieutenant requires us to inquire whether the works can be profitably undertaken by the proprietors of the flooded lands under the provisions of the Drainage Act; whether the works for the relief of the lands flooded by the Barrow and its tributaries should be carried out as one project, or whether the river Barrow itself should be first separately dealt with, and the drainage of the tributaries left to be subsequently carried out under the provisions of the Drainage Act, and how the funds necessary for the works should be provided—if they should be provided by a loan of public money, whether, as consideration of the sanitary or other benefits to be derived from the works, the towns situated on the river or the district at large, independent of the lands directly benefited

should bear any portion of the charge in repayment of the loan; so that your question, you see, deals very much with one of the matters we have to inquire into—as to how the money to be expended in effecting the drainage, if it is carried out, should be provided. Now, one of our objects in meeting here to-day is to ascertain from those interested, what they think on the subject.

416. Mr. Garvey.—You see, sir, it would be manifestly unfair to charge the proprietor in the usual way and leave him afterwards to deal with his tenants. I have been very much interested in drainage districts in the King's County—perhaps more so than any one else, and I have had a great deal to do in carrying out a number of drainage schemes, and have always been an advocate and a promoter of drainage in every way, but circumstances have altered a good deal now. These lands having been visited by the Sub-Commissioners in their present state and the rents having been considerably reduced, of course the landlord would derive no benefit from any improvement that might be effected.

Sir JOHN McKEILLIE.—I have just mentioned to the Chairman that the fact of the judicial rents having been fixed by the Sub-Commissioners will not in any way affect the landlord's right to recover the due proportion of the charge from the tenants, in respect of any improvements which may be made on the lands under the Drainage Act—you have the same power as under the old circumstances, before the judicial rents were fixed.

417. Mr. Garvey.—But, I must say that I totally object to that cost being put upon the landlords under the present circumstances—that they should be primarily charged with the drainage and then be obliged to enforce repayment of portion from their tenants. Very great differences of opinion between landlords and tenants might arise, and naturally would arise, under these circumstances. I merely state as my opinion that it would not be right or proper to put the landlords or proprietors in that position with the occupiers, more especially as the occupiers themselves are not consenting parties to the work going on. Now, having stated my opinion with regard to the proprietors of these lands being made in any way primarily liable for the cost of the drainage works, I wish to say—and this affects the tenants, perhaps, more than the proprietors, though I don't see any of the tenant occupiers of these lands present—that some time ago, when this project was spoken of, the occupiers were very much alarmed at the idea of this small tributary being added with a heavy increase, for I had some notion of what the charge would likely be, and when I spoke to the occupiers about it, they very much objected to it. And it does seem to me that the valuations are exceedingly high in the case of these two townlands. I only speak of those I am conversant with. I think that the probable increase in the value of these lands, is set down at very much beyond what it ought to be, and beyond what the tenant occupiers should pay &c.

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Mr. Toller R.  
Gorrey.

indeed far beyond the value that they would derive. Now, in the case of the first township, Colgagh, the whole township according to the survey is said to be either flooded or injured by flooding. Well, that I don't dispute; but the present actual value of the land to be drained or improved is set down at £64 1s. 2d., and I may tell you that that is a higher rate of value than the original rents—a higher rate, mind you, than the rents were before they were reduced, and considerably higher than those rents are at present.

418. Mr. BARRY.—Do I understand you to say that £64 1s. 2d. is higher than the present value of the land?—It is higher than the present valuation—it is higher than the rents were before they were reduced, and considerably higher than what the rents are since they have been reduced. They have not been so much reduced on this township, but the original rent was only £35, and the lands are set down there as being value for £64 1s. 2d.

419. That is in Mr. Fitzgibbon's valuation?—I don't know where it is—I merely give you what appears on the face of this schedule. The probable increase in the present valuation is put down at £40 1s. 2d.

420. I should like to take down the figures of the actual rent before the judicial rent was fixed, and what the judicial rent has been fixed at?—The original rents amounted to £35, and they were reduced to £48. It is not all let in one holding, you know.

421. Sir JOHN McKERRAN.—But you have taken in side the whole township of Colgagh?—Yes.

422. Portion is stated to be injured only, and portion flooded?—Yes. The whole township is stated to be either injured or flooded.

423. The main question is, what you look upon as a fair value for the improvements?—I am just coming to that. But I first of all wanted to call attention to what is called the present value, with the view of showing that that is put down at rather too high a figure.

424. Was the rent that you mentioned that of the whole township of Colgagh?—Yes.

425. The former rent was £35, and now it is £48?—Yes.

426. And that included 535 acres?—Well, I don't know—I think there is a lot of high bog in it—an immense quantity of high bog. You have 363 acres down as being injured in the two townships; I think the whole is 339 acres, but of course there is that high bog.

427. Mr. BARRY.—But these objections which you take are for the township as a whole?—Yes, as a whole.

428. You don't go into the question of details as to Mr. Fitzgibbon's valuation?—Well, no, I have not gone into that closely—I have not had time. I see that there is so much set down at 4s. 6d. an acre, and so much at 5s. 6d. the increased value per statute acre.

429. Part of the land, no doubt, is bog?—Yes.

430. But part of it is arable land?—Well, no. Now, coming to the proposed probable increase of value, £40 1s. 2d.; supposing the land to be ever so well drained, I think that is a most enormous increase, and quite out of proportion to all benefits that would be secured, maxims, no the whole of this land is more. There is not a scrap of upland in that township. Just along the side of the river there is a slight sandy deposit which makes a bit of meadow, but there is not a scrap of upland in the whole township.

431. Do I understand you, by that, to mean that it is all black peat soil?—Yes, it is all black peat soil. A considerable portion of it is under cultivation, but still it is black moor—it is bog—and under no circumstances could it be possibly worth 4s. 6d. more per statute acre.

432. Do these comprise all your objections on the part of the Earl of Rosse, in relation to this township of Colgagh and the valuation attached to it?—Yes.

433. Now, have you considered the township of

Clonacree?—Yes, and I would make the same remarks with regard to Clonacree, except in this particular, that some of the township of Clonacree is upland. I have no objection to make to the quantity of land that is stated to be flooded, or injured, but I do object to the valuations. Of course, it makes no matter what the present actual value is set down at—it is of no importance; but I would point out as a fact, that the figure set down as the present actual value, happens, again, to be in excess of the rents. That, however, does not affect the question—it is the increased value that is of importance; and I think the estimated increase, considering the quality of the land to be improved by the drainage ever so well carried out, is extremely high. It strikes me—but it is only a conjecture, I have no authority for saying it—but we all know that the drainage of the Barrow is a very costly work, and it would seem that some of the expense of draining the main channel was proposed to be levied on the tributaries. Of course, it is quite right that they should pay for the outfall.

Sir JOHN McKERRAN.—I think you are under a misapprehension as to an undue proportion of the expense being charged upon the tributaries, or that that has been taken into consideration at all by the valuer in putting down his estimated improved value. You are quite under a misapprehension as to that. The amount he has set down as the probable value of the improvements is the value irrespective of the cost of the works being more or less.

434. Mr. Gorrey.—I am glad to be corrected—I stated it was merely a conjecture on my part, and, of course, I am quite satisfied now I was in error. If the valuator had instructions only to value the lands as they were, I am sure he did so; but it struck me, knowing something of the valuation of lands in other districts, that there had been valued in like manner. But there is no doubt that the valuation in this instance is very high.

435. Mr. BARRY.—With regard to Clonacree, can you give me the whole acreage of the whole township. I believe it is not included in the schedule here?—There are about 700 statute acres in the whole of Clonacree.

436. Now, let me proceed with Clonacree. Do I understand you to say you agree with the valuator, that the whole of the township of Colgagh was either flooded or injured?—Yes.

437. And, therefore, we have here 359 acres set down as being the total area of Colgagh township?—Yes.

438. Then we come to Clonacree, and you say that only portion of that is flooded or injured?—Yes.

Well, I am anxious to put the acreage of the whole township, to compare it with the land that is flooded or injured.

Mr. PENNY.—Clonacree contains 1,807 acres 1 rood and 33 perches.

439. Mr. Gorrey.—That is quite true, but that includes a great quantity of deep turf bog.

Mr. BARRY (to Mr. PENNY).—Can you give us the acreage of Colgagh?

Mr. PENNY.—Colgagh is put down at 319 acres—that is the whole township—the total area.

440. Mr. Gorrey.—The 319 acres is the whole in the occupation of the tenants, as injured or flooded, but there is some deep turf bog besides that, in the landlord's hands, and that would make the difference—that is not coloured on your map. When I say it is all injured or flooded, I mean that I think it would be improved by drainage, because it is not all flooded, nor is it very much injured. Some of it is at present so flooded; but I think it would be an improvement to have it drained, and, therefore, on that score, I don't offer my objection as to the quantity.

441. Sir JOHN McKERRAN.—You mentioned that a portion of the land is tiled, is there any part of that within what is marked as flooded?—No, I think not.

442. And what is flooded could not be tiled, I suppose?—What is flooded could not be tiled I think with adity. It is always under grass.

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Garsy.

443. And 5s. 6d. the estimated improved value per acre, you think that is too much for this rendered capable of being tilled?—Too much; very much too much.

444. Why, might I ask?—Because the quality of the soil to be improved is not sufficiently good to render that benefit.

445. What does it produce now?—It produces coarse grass and sedge.

446. And if it could be tilled what would it then produce?—If it could be tilled it would produce roots and cereals, of course.

447. And potatoes?—Yes, and potatoes.

448. And would not the power of producing these crops be worth more than 5s. 6d. per acre?—I do not think so.

449. It is black bog you say?—Yes.

450. Is there no clay in it?—I mentioned that there was a slight deposit along the edge of the river. My experience of land of that kind is that unless there is a very considerable deposit in the drainage district, when the floods are taken away after a few years, and the lands are grassed down, the quantity the land produces is very small and poor. The tenants who hold these lands are not people who could till to great advantage a large quantity of land which is not suited for tillage. If a man had a considerable portion of upland and was able then to lay down that in good grass, and go and till his moors, it would be a great advantage to him, but that is not the case here.

451. Then is the land that is injured saturated only?—It is not saturated, it is injured.

452. It is stated to be injured, what does that mean?—I am speaking now of the part that I know is flooded. There are wide open drains there, and these at certain times of the year become full, and when the river is full they cannot discharge, but the land is not at all times saturated.

453. Would it require sub-drainage or thorough drainage to reap the full benefit of the removal of the floods, or would the injured lands require additional

outlay to get the full benefit?—That all depends on the fall. If there is a good fall given—

454. But would it require thorough drainage to secure the whole benefit?—Well I don't think it would require very much thorough drainage.

455. And what does that injured land generally produce now?—The injured land produces rye, potatoes, and oats.

456. Where tilled, at course?—Yes, where tilled.

457. Is there not a portion of it under grass?—Oh, yes, there is a portion of it always under grass.

458. Coarse grass?—Yes, coarse grass.

459. Mr. BARRIS.—Would you give us the rent of the 296 acres in Glenavoe that is said to be either flooded or injured, assuming that all that is let to tenants?—Yes, all that is let to tenants. The rent of Glenavoe is £210.

460. The whole of Glenavoe?—The whole of Glenavoe.

461. We have it here, according to Mr. Fitzgerald's valuation, that the probable increase on the present actual value of the lands to be drained or improved put down at £46 is 1s.—Yes.

462. Are you prepared to say whether that is over or under the rents now received from these lands?—I cannot say. I have not had access to the maps here, but of course that was my own fault, for I have been away from home, and therefore am unable to divide the quantity charged from that which is not charged. That is all I have to say.

463. You consider the improved value put on the lands by Mr. Fitzgerald to be too high?—Yes.

464. Could you give us your idea of what you consider would be the real value of the improvements, what would be the measure in your opinion?—Well, I don't wish to go into that at present. If this matter was to be charged to the proprietor it would be my duty to do that, but I hope it won't be, as I know that every objection would be given to its being charged in such a way. I am not at present prepared to go into details and give my opinion as to what the proper value would be.

Mr. Robert  
Lucas.

Mr. Robert Lucas, of Springfield, examined.

465. Mr. BARRIS.—Can you give us any information, Mr. Lucas?—Am I at liberty to point out any inaccuracies in this valuation schedule?

466. Most certainly you are. Tell us what they are?—You will find my name down on page 4 for Esker Bog (Monastera), and Esker Bog (Ballynakilly); why these townlands don't belong to me at all. They belong to Mr. Benjamin Mundy Ball, of Monastera.

467. The other two townlands in the barony of Cookstown, namely Ballycon and Ballybragh, or Springfield, do they belong to you?—Yes, but Ballycon in the schedule represents more land than I hold. My land there is on a hill, and portion of it runs into Mr. Ball's property, and that seems to be all included in and in the schedule. I don't think there is more than six or seven or eight acres of mine flooded in Ballycon. There are only thirteen acres of mine flooded or injured in that townland.

468. Do you mean thirteen acres flooded and injured by floods?—Injured, to a certain extent, some of it is much flooded, but in dry weather it is pretty fair.

469. Before you go on I should like to ask you whether any part of Ballycon belongs to Mr. Ball?—Yes, a good part of it—he has more of Ballycon than I have. I should say that I find there is not so much as thirteen acres of my land in Ballycon flooded. I find there is not more than six or seven acres flooded, and the other part which is flooded belongs to Springfield. (Witness pointed out these lands on the map).

Mr. BARRIS (to Mr. PINEY).—You will have to point out to Mr. Fitzgerald that portion of this land does not belong to Mr. Lucas but to Mr. Ball. Mr.

Lucas will now show you exactly where his land goes, and Mr. Fitzgerald can correct his valuation.

470. To Witness.—Have you any other objections to make or any other observations to offer with regard to this valuation schedule?—No, only I think the valuation is too high. I don't think the land will be at all improved to the amount calculated there.

471. But the amount is based on the calculation that what is put down is your property; of course the total would be less?—That, of course, makes a difference.

472. Well, is it to the amount or is it to the rate per acre for estimated improvement that you object?—Oh, it will be improved decidedly by draining—a good deal of the low-lying lands of the river will no doubt be improved by the drainage.

473. Then your objection arises merely from the fact that more land has been put down as your property than belongs to you?—Yes, and according to that it seems very high.

474. Sir JOHN McKENNEDY.—But take the land by the acre, what would you say would be the value of the improvement?—I suppose you could form an idea?—Well, I could not tell what it would come to.

475. Well, I can tell you the amount put on by the valuator for the improvement, irrespective of the present value—the estimate for improvement of land actually flooded there is 5s. 6d. an acre; now what do you think of that?—Well, I dare say if it was a sure thing that it would be worth that. I don't think that is over the mark.

476. There are fifty-nine acres in the townland of Ballybragh, and of that five acres are put down at 5s. an

are improved value and fifty-four acres at 3s. 6d. improved value as regards the flooded lands, and there are fifty-two acres of injured lands put down at an improved value of 5s. per acre—that is merely injured not flooded—and that is the whole townland?—These are statute acres I suppose.

477. Yes. Do you consider that valuation would be fair both to the flooded lands and the injured lands?—Yes, in my opinion the land would be improved for an acre.

Mr. George Güller examined.

Mr. George Güller.

481. Mr. BRUCE.—Are you an occupier of land in the district?—Yes.

481. Where?—At Ballyhugh.

482. How much land do you hold?—About 120 Irish acres.

483. About how much of that land is flooded or injured by water?—I would say about ten acres.

484. Is that flooded and injured land black peat soil?—Oh, yes—the whole ten acres.

485. And what do you consider their present value, in their injured state, is per acre?—About £1 per acre.

486. That is their present value?—Yes, the rent value.

487. I am asking you their present value in their flooded and injured state—as they now are—per acre?—Well, £1 per acre.

488. And what addition to that value would you consider would be conferred by the lands being relieved from water?—Well, as the certainty of their not being flooded—I could not say for the propagation might decrease instead of increase as a result of keeping the water off altogether. Because if the land had not moisture it might interfere with the quantity of the meadow. Seven acres of these lands are in meadow and the floods make an increase in the meadow. If it was thoroughly drained, say beyond its natural drainage I think the land instead of being improved would be worse off, because the natural grasses might decline for lack of moisture. The river edge is good—you will find that there is better grass there than where the flood flows off. If the flood declines over the land here we will not have the sort of grass to make good hay—the moisture is the only support for the meadow.

489. Mr. SMITH.—If that land was prevented from being flooded in such a way that you could thoroughly drain it and break up the land and lay it down, would not that produce more value—considerably more value than at present?—Yes, but that would be very expensive.

490. But would not it be worth that?—There would have to be a roadway to that place if you proposed to till it. You could not get horses and carts into it without a roadway and to construct that would take a good deal of money. You would require to make a roadway for a quarter of a mile and even then I don't think you could till it. Supposing you had to run into pasture it might run dry and would not produce good pasture. The natural grasses would decline, whereas now when the flood comes a good deal of meadow is got off by the river edge. I suppose if you took away the floods altogether all that would be lost; but if you could secure that in a safe way by drainage of course it would be of more value—there would be more certainty of the crops. It is an uncertain crop now—the water cannot go down from it and the flood runs back.

491. But if this drainage is done it is the intention to prevent the land being ever flooded again unless something extraordinary happens—something that may occur once in twenty years; that is the intention of the engineer?—Well, the meadows won't be so good when they lose the moisture, and then on the other hand you cannot get the meadows when there is a overflow.

492. Mr. HARRARD.—Is it your opinion that the

478. Have you any other observations to make yourself with regard to the schedule?—No, I don't think I have anything else to say.

479. Have you any thing to say as to the general scheme of improvement of the district of the proposed drainage?—Oh, I think it would improve it, but it will depend altogether on what change we have put on. If the charge is not too high it will be an improvement and an advantage to have the work.

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Mr. Robert Lewis.

meadow lands you have described are improved in value by being flooded in winter?—Yes. The flood brings out the moisture on the meadows and after a good flood they will produce a heavier crop.

493. Mr. BRUCE.—Are these lands not flooded in summer?—Yes, sometimes.

494. Does that improve the meadowing?—Early summer flooding does—flooding in April or May.

495. Mr. SMITH.—And don't you lose your hay sometimes by the floods?—Well, I did not lose very much hay since I became the owner, but still the land was flooded.

496. Mr. BRUCE.—Could you give us any evidence with regard to the flooding of lands in your neighbourhood, which are not in your own occupation?—No, I would not wish to do so, sir.

Mr. PENNY.—The next witness is Mr. Ridgeway, the gentleman from whom I received the following letter:—

Ballymore, Clontarf, Dublin, July 2nd, 1885.

Sir—I have received the Schedule of the Barrow Drainage Commission together with the acreage of flooded lands. I must tender myself as a witness at the sitting to be held at Philipstown on the 15th inst., as I am stated to have a much larger acreage of flooded and injured lands than is actually the case. Will you be good enough to send to my agent a witness on that day and oblige.

Yours faithfully,

JAMES RIDGEWAY.

497. Mr. Ridgeway.—Since I wrote that letter I have examined the maps and compared them with the schedule, which I find is correct. But I wish to be examined here on the part of an invalid lady who cannot attend—there is a mistake with regard to her property; portion of a gentleman's land is put down as hers.

498. Mr. BRUCE.—What is the name of the lady?—Miss Sarah Matilda Gatchell. I have her authority to give evidence on her behalf. You will see on page 5 of the valuation schedule she is put down as having in Derrymore, 148 acres, 2 rods and 20 perches of flooded and injured lands. As a matter of fact, Miss Gatchell only owns a portion of Derrymore—only about 35 Irish acres. (Witness pointed out on the map the portion owned by Miss Gatchell).

499. Do you live in Dublin?—No. I live in the country.

500. I think, Mr. Ridgeway, the objection you are now going through, of pointing out to the Secretary this lady's land upon the maps, could be more easily got through in this way—a tracing of the portion of this map which refers to Miss Gatchell's property can be sent to you, and you can mark the parts that are really hers, and then return it to Mr. Penny?—I shall be most happy to do so.

Mr. PENNY.—I think it would be well to point out these objections to Mr. Fitzgerald.

501. JAMES M'KEELAR.—It is properly his duty if his attention is called to an error, to have it adjusted.

Mr. BRUCE.—Mr. Penny will please take Mr. Ridgeway's address, and furnish him with a tracing of the map, and we can communicate afterwards with Mr. Fitzgerald, and have the thing set right.

502. Mr. JOHN M'KEELAR (to Witness).—Miss Gatchell has 30 statute acres, 2 rods flooded?—I don't

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agree in that; I don't think she has so much, but I have no data to correct that by here.

502. Well, let us suppose it is only 10 acres, and that the proposed increased value per acre would be 5s.—do you think that the value of the benefit to be conferred would be worth 5s. an acre?—I don't think that is too high as regards the higher land. It has a gravelly bottom, and will be considerably improved by the drainage.

503. Mr. Thomas Richard Murray.—I appear for the trustees of the Marquis of Downshire, and I will ask you to allow Mr. Ridgway to make two corrections with regard to townlands with which he is acquainted. These are townlands set down in the name of the Marquis of Downshire, and Mr. Ridgway can show that they belong to other landlords.—Mr. Hume and Lord Seton. I suppose it is a mere mistake in the printing.

504. Mr. Ridgway.—You will find the lands referred to on page 4 of the valuation schedule. There is Clonsurra—now that townland which is there set down as belonging to Lord Downshire, belongs to Mr. Arthur Hume, of 63 Dawson-street, Dublin, and not to the trustees of Lord Downshire. You will find Mr. Hume's name mentioned in the schedule at number 19 of page 5.

505. Mr. BROWN.—Is there any other correction?—Oh, yes, with regard to the townland of Glencent, that is put down as belonging to the trustees of Lord Downshire, whereas it belongs to Lord Seton.

506. Are there any other corrections?—No others.

507. Are you the agent for Mr. Hume?—No; but I was formerly, and so was my father.

508. Are you agent to Lord Seton?—No; but I am tenant of part of the lands of Glencent, under Lord Seton.

509. It is entered here as having 39 acres flooded?—Yes.

510. And are the whole of these 39 acres flooded?—Yes.

511. Do you concur in the increased value put upon them by reason of this drainage if carried out, and if the floods were abated, of £10 15s. 9d?—I think in this case the prospective increase is rather high. It is a deep boggy heath, which will not improve as much as those flooded lands which have gravel bottoms. Their value would be greatly increased by drainage, but this sort of land—deep bog, now flooded, will not be so much increased in value.

512. According to your view, what would be the improved value for relieving these lands from floods?—Well, I have not formed an opinion about that. I have not experience enough of seeing these lands drained to form an opinion; but I would say about 3s. 6d. an acre.

513. Sir JOHN McKENNAN.—What is the nature or quality of the soil?—Deep bog.

514. Is there no mixture of alluvial soil?—Not in this district of Glencent—there is no alluvial deposit.

515. Is it on the Slane river?—No, it is on the Fiddle river.

516. Mr. Samuel Waller, Solicitor.—I appear on behalf of Mrs. Gresham, my client.

517. Mr. BROWN.—And what is the nature of the objections you wish to make?—My first objection is that there are 345 acres put down as flooded and injured on her property, while that is 155 acres, 2 miles, and 39 perches more than is actually the case. I have the maps here and the proofs, which I am ready to hand in. You see that the total acreage is 445s. 2s. 50s. of flooded and injured lands—that is in your schedule; but we can only make it out 191s. 3s. 21s., so that there is a difference of 155s. 2s. 39s. You will find all that here—in the paper which I now hand in. (Document handed to Secretary.) We had an elaborate map made in the year 1837, and there has been no alteration on the boundaries since. That is all pasture land.

518. Sir JOHN McKENNAN.—Is all that (in map) Mrs. Gresham's property?—Yes.

Well you can easily track the boundaries on our map, at present?—Yes. Since this map was made for us in 1837 there has been an embankment built—it was constructed by the late Mr. Gresham—the entire way along the river five or six miles.

519. Does that protect the land from floods?—It does efficiently, except from bank water.

520. Then that would be a proper matter to express an opinion upon—with regard to the extent of the benefit of the proposed valuation?—As to the increased valuation which I see is put on the different fields, we don't object so much to that; it is to the quantity we object.

521. Mr. BROWN.—That is the quantity of land which is actually flooded?—Yes.

522. And you say that so much is not injured?—Yes. Actually some upland is included in the area. There is another objection I wish to call attention to. In the area which is given here as that of the flooded and injured lands there are two islands which are at the bank of the river outside our boundary—outside the boundary wall or down wall that has been made. Now these islands are a most valuable part of the whole. They are subject to floods, but very often we get two crops of them in the year. Sometimes a crop is lost, but frequently two crops are had there in a season. The most valuable one contains 5s. 3s. 8s., and the other 4s. 0s. 9s.

523. Mr. HARRISON.—Do you often lose the whole crop on these islands?—Oh, yes.

524. Mr. BROWN.—Wouldn't it be better if the floods were altogether taken away, so that you would not ever lose a crop?—There is no doubt about that, but supposing this drainage is carried out, it is quite plain from the lie of the river that the stream will be run right through, so as to take away these islands altogether.

525. Mr. BROWN.—That is a matter that can be easily ascertained?—It is so—apparently.

Sir JOHN McKENNAN.—Then that will be a matter for consideration afterwards. Any land taken for the purpose of sharpening the river and making the new cut will, as a matter of course, be paid for.

526. Mr. BROWN.—I would be glad to know whether you have considered the question of the acreable increase of value which is expected to be derived from the drainage in regard to Mrs. Gresham's property?—I have seen the increased value which has been put on, and I don't object to that.

527. That is to say the increased value which is expected to be derived is £20 7s. 6d?—That is supposing the acreage to be correct.

528. But you say the acreage could be reduced considerably, however the acreable value you don't object to?—No, I don't—according to the different valuations that have been put down.

529. Sir JOHN McKENNAN.—The value put upon the improvement of the injured land is 2s. per acre on one lot, 3s. per acre on another. On flooded land there is one lot at 4s. per acre, another lot at 3s. and there is a large lot of flooded land—149 acres—at 4s. per acre?—Oh, I have seen these valuations.

530. Then you don't think those rates are too much?—Supposing the acreages to be correct I don't object to the figures.

531. Mr. BROWN.—Mr. Fitzgerald includes some lands as being improvable and to be improved, but you don't there will be so much of these lands?—Quite so—I am sure there won't.

532. Might I ask whether you apprehend it is owing to the embankment which was formerly built, that these lands won't be improved by the striking of the river?—I think there is a great portion of it where it would make no improvement.

533. The expense of the embankment—is that also a ground of your objection to the valuation of Mr. Fitzgerald?—Precisely, we don't get credit for the

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embankment. That embankment cost, I suppose, between £400 and £500.

534. Mr. SMITH.—Is that moory land?—We can raise peatlands on it even if there is a flood, by having the flood kept off it.

535. Is it injured land at all then?—No—certainly not.

536. You think the embankment improves it?—Yes.

537. Mr. HARRARD.—Does the embankment you speak of keep out the floods entirely?—It does.

538. Entirely?—Yes—entirely.

539. Where is this land?—It is just on the straight drive. The heaviest flood that ever was, was kept out by this embankment. On the occasion of the heaviest flood you can walk dry on the top.

540. Where is your place situated?—It is just a mile and a half from Rathangan.

541. Mr. George Gibbons.—I appear upon page 6 of the valuation schedule for two places—Cherryhouse or Derrydown and Moanmore. There is a great error in the number of acres stated to be flooded in Moanmore—where you set down the quantity at 182 acres.

542. Mr. BRUCE.—You consider that too large?—There is not more than twenty Irish acres flooded there for the last forty years. That would be about thirty statute acres.

543. Then you would transfer the balance of the land stated to be flooded to that which is stated to be injured?—Yes. Of course the amount is correct so far as to what the property contains. It contains 238s. 3s., but there is a great deal of that not injured. It is a very peculiarly situated property—not more than forty perches of the river which is to be drained runs past it and none of the river runs through it. Just as I say, about forty perches bounds one side of it. There were two rivers sunk up through the property at the expense of the property itself, one in the centre and one at the side as a boundary. There had been two old rivers there, but they were very crooked so that two new rivers were sunk deviating very much from the courses of the old ones.

544. Do they both go into the Barrow?—No—into the Cullin; the property is not within ten miles of the Barrow.

545. Well then what do you say is the area of the flooded and injured lands?—The area of the flooded lands is thirty statute acres and these are only flooded very seldom.

546. Then how many acres are injured?—I could not say there are any injured at all for want of drainage of the main river.

547. But they are injured by water?—They are injured by water occasionally—by a little under water, but they are never flooded.

548. Would they be relieved by lowering the body of the river?—It could be done without lowering the level at all. We have drains eight or nine feet falling into the tributaries that have been made.

549. And these lands are considerably higher than the main river?—They are considerably higher than the main river.

550. Does the land rise suddenly?—Well, it rises gradually but some of it very abruptly.

551. What is your idea of the total flooded and injured lands that would be benefited by thorough drainage of the river?—I could not tell you that. There is a fall of eight feet or perhaps more, but in some places along this land which is injured there is a sort of natural water rises, as I described, occasionally. If the river was drained it would take a good deal of that away.

552. Then, as far as that goes, you think it would be a benefit?—Yes, but I could not estimate what the cost might be.

553. What is the nature of the flooded lands?—It is alluvial soil with a sort of blue clay.

554. Well, that flooded land would be very much

benefited by being relieved from the floods? It would not give more meadow than it does, but it would be more certain. I have not lost one load of hay on that meadow for the last twenty years, although, sometimes perhaps, the hay might be a little injured.

555. You are Mr. Fitzgerald estimates the increased value owing to the proposed drainage at £51 12s. 8d., in his schedule?—Well, I must remark that I hold about 100 acres, but there are tenants occupying the rest of this property, and I suppose Mr. Fitzgerald included them.

556. I suppose so, but your evidence relates more to your own holding?—Oh, chiefly to our own holding. There are two of the tenants who hold part of it here, if you wish to put any questions to them.

557. You are acquainted with the part of the property which is held by the tenants—I suppose there is a good deal of that flooded?—I don't think there is any part of it flooded.

558. Well, injured?—Perhaps it is injured by the water, but not by the water of the river proposed to be drained. The two rivers that are there drain the place very well already.

559. And they have been sunk, you say?—Yes, they have been newly made, deviating entirely from the old track, which was zig-zag. The new track is cut straight, and the new rivers have been sunk two or three feet lower than the old ones. When the floods come they come down rapidly, and they flow away rapidly.

560. Is there no back water at these newly sunk tributaries from the main river?—Sometimes there is a little—on these thirty acres I described as being flooded.

561. May I ask the acreage of your holding?—I occupy, myself, about 100 Irish acres—I am not sure exactly, for there is a very large tract of bog attached to this property. The whole property contains 1,068 statute acres, including the bog.

562. Sir JOHN McKENNA.—All your observations up to the present have reference to Moanmore only?—Yes.

563. Mr. BRUCE.—You spoke of the main river being only for forty perches adjoining your land?—Yes.

564. I suppose your tenants' lands lie along the river?—No, they are far away from it. The land commences narrow at the river and goes off widely into the country, running away from both the road and the river. I might state that a good deal of this land described as injured is land which has been reclaimed from the old state. There are a number of straight drains in several places, from four to six feet deep, enclosing fields of about seven acres, which drains were never there before.

565. Sir JOHN McKENNA.—Then this is thoroughly proved in fact, that is, that minor drains are put in at a distance of from forty to sixty feet apart?—Quite so, I have done that with most of it.

566. And are these drains working very well?—Very well. They have all a fine fall and work well by extending to them naturally. There are some, however, in the tenants' occupation and they are not very well cleaned out—these drains get choked.

567. Could you mark on the map the extent to which you say your lands are injured or flooded?—Certainly.

568. Mr. BRUCE.—Have you got a map yourself here?—No.

569. Well the maps here are on the sheshinch scale and you will observe the colours on them. Mr. Fitzgerald sets out the injured lands by colouring them in blue, and if you take the opportunity of looking at them perhaps you might be able to point out to Mr. Bruce those parts which you say are not injured and which should not be included in that coloured portion?—Yes, and while I am doing so, perhaps you would like to ask some questions of the tenants, Murtagh Connor and William Lowler.

July 8, 1882.

Marshall  
Cowan

\*560. Mr. BATES.—How much land do you hold?—About 50 acres.

\*561. Does any part of that adjoin the main river?—No, the main river is half a mile away. My land adjoins a small mill stream.

\*562. Does that flood your land?—No, I have no land flooded, but there is mine water, or under water, which does most injury.

\*563. That is the spring water which comes from underneath. By that you say the land is most injured?—Yes.

Marshall Cowan examined.

\*564. Has the land not a slope or fall?—Oh, yes; a very good fall.

\*565. What is the name of the townland in which you say your farm is?—Moanmore.

Mr. BATES.—Can you tell us, Mr. Penny, is Marshall Cowan's holding included in the coloured portion of the map?

Mr. Penny.—No, it is not included at all.

Mr. BATES.—Then it does not come into our inquiry. Is any of William Lawler's holding coloured?—No, neither of these are on the main river—they are a long distance from it.

Mr. Gibson.

Examination of Mr. Gibson resumed.

\*566. Mr. BATES.—Then the coloured portion, after examination of the maps, you see, comprises your holding and none of the tenants' holdings?—What I pointed out to Mr. Penny, is my own holding.

\*567. But is there any part of the coloured portion held by the tenants?—Only bog land. There is only about 70 statute acres of my land flooded altogether. Now, as regards Cherry Chase, I think the land landlord ought to be put down for that—that is Mr. Christopher Rynd.

\*568. But you are put down as the owner?—Yes.

\*569. Sir JOHN M'KENLIE.—How do you hold?—By a lease for ever, but Mr. Rynd gets £70 a year, head, out of that.

\*570. Mr. BATES.—You are put down as having there 301 acres flooded, and 33 acres injured?—I hold

that the whole of the 201 acres are flooded, but there are some injured. It is a flood callow. None of it comes under the designation of injured—it's all flooded.

\*571. Do you concur in the estimate of the flooded lands—201 acres—at Cherry Chase?—Yes, I think it is correct. There are about 150 Irish acres, and there would be about 120 Irish acres flooded.

\*572. Well, the amount of the improved value is put down at £22 3s. 3d.—that is 4s. an acre for one portion, and 5s. 6d. for another—do you concur in that estimate?—I think that about 5s. or 5s. 6d. an Irish acre would be fair.

\*573. Are there any other observations you wish to make?—No, only there is a small portion of the bog in that.

Mr. Thomas  
Richard  
Murray.

Mr. Thomas Richard Murray examined.

\*574. For whom do you appear?—For the trustees of the Marquis of Downshire, on whose behalf I wish to object to the valuation put on Eaker Moor and Cusballin, because they run into a deep bog. I have been all over this district, so far back as Sir Richard Griffith's time, and had it completely surveyed. The townland of Eaker is in two divisions. Mr. Manning valued and surveyed all these lands in '63. There is no gravel or soil there.

\*575. Do you object to the average put down?—No.

\*576. Then what you object to is the valuation put on the lands?—Yes, to the valuation put on them.

\*577. As regards Eaker Moor, do you object to the £75 11s. 3d. being put down as their present value?—No; that is what Mr. Manning valued it at himself.

\*578. Then it is to the probable improved value of £29 14s. 2d. that you object?—Yes; I think it is very excessive.

\*579. How much do you think that ought to be reduced to?—I could scarcely say, because it is all bog. The improvement would be very little on it, for it runs up in the centre of the Bog of Allen and there is no gravel within reach of it. There is no doubt it would be somewhat improved.

\*580. You are not prepared then to give us an idea of what the improved value would be?—The very highest value that I could put on it would be about half what is down in the schedule.

\*581. Now we come to Eaker Moor (Manserestruck)—do you object to the average there?—No.

\*582. Do you object to the present value put on that—£42 16s. 2d.?—No; what I object to is what has been put down as the estimated improved value—£29 7s. 2d. Nearly half of that would be scarcely likely what it would be.

\*583. Then your evidence is very much the same regarding this townland as with respect to Eaker Moor (Ballyaskill)?—Precisely.

\*584. We now come to Cusballin—in the average there right, according to your idea?—Yes, according to Mr. Manning's survey.

\*585. And what do you say as regards the present value put down?—It is fair enough.

\*586. Then what do you think of the estimated improved value?—It is very excessive, because you can make that head very little better than it is.

\*587. Can you form an estimate of what the improved value ought to be, in your view?—I think the whole improved value could not be more than £20 a year, and I don't see that even that should be added to the rent.

\*588. Do you wish to call attention to any other townland?—No, all the others would benefit considerably.

\*589. In forming your estimate of what the improved value would be, if the drainage were carried out, upon what basis do you go in arriving at your opinion?—I formed my opinion according to the acreable improvement which would not be taken in those remote districts than is 6d. per acre, because there is no gravel. It is all deep bog.

Sir JOHN M'KENLIE.—Mr. Gibson, your objections regarding the extent of land charged in the schedule will be referred to the valuator for inquiry, and Mr. Fitzgerald will then make his remarks upon it as to whether he admits them. If he does, of course further inquiry will be necessary on the spot.

Mr. Gibson.—I would be very glad that there would be further inquiry, because I think that property is very peculiarly situated.

Mr. BATES.—Is there anybody else here who wishes to give any information or evidence on the subject of our inquiry?

There was no response.

The Commission then adjourned till Friday, 10th July, at Mountmellick.

July 19, 1885.

FRIDAY, 10TH JULY, 1885.

The Commissioners held a sitting at the Court house, Mountmallick, Queen's County, pursuant to public advertisement.

Present:—The Right Hon. H. BRUEN, D.L., Vice-Chairman (presiding); Sir JOHN McKEERIE, Colonel CARMON, Mr. HASSARD, C.E., Mr. HUMPHREY SMITH, and Mr. J. A. CASSIDY.

Mr. PERKIN, Secretary, was in attendance.

Mr. BRUEN.—In opening our proceedings to-day I wish to give notice that we are here to receive from those who are interested in the drainage of the river Barrow and its tributaries, any information they wish to give and also to receive any observations relative to, or objections that may be made to the schedule of the flooded and injured lands and to the valuations thereof which are set out in the schedule that has been circulated among the different proprietors. If any gentleman here present wishes to offer any evidence or make any remarks we will now hear him.

Mr. PERKIN.—There has been one objection lodged by Sir Allen Walsh, which I will now read for you:—

"Ballykilleen, Stradbally, July 8th, 1885.

"Sir,—I desire to acknowledge receipt of your letter dated June 27th, with enclosure relative to land, my property, supposed to be injuriously affected by the Barrow floods. In

reply I have to state that I object to their being included in the list of lands supposed to be benefited, for the following reasons, 1st. The backwater of the highest Barrow flood never extends higher up the Stradbally river than Derrybrook bridge, which is nearly a mile lower down the river than the lowest portion of the lands in question; 2nd. All the improved lands which would pay for drainage have already been drained four feet deep. This drainage was carried out under the Board of Works at various periods between 35 and 38 years ago. I have not the means at hand of testing the correctness of the valuations and surveys, but I am inclined to think they are incorrect in every particular. I propose to attend the meeting at Mountmallick on Friday, the 10th instant, and to give evidence upon these matters. I am, sir, your obedient servant,

"ALLEN WALSH.

"James S. Perry, Esq.,

"Secretary, Barrow Drainage Commission."

Sir Allen Walsh examined.

Sir Allen Walsh.

580. Mr. BRUEN.—I suppose you are here, Sir Allen, to support those objections?—Yes, my objections to my land being included, as set out in that paper. Nothing can be done to the lands at all, unless the supply weir for the Grand Canal is removed, and even that would affect only a very small portion of the lands—not above eight or ten acres. I have been looking at the maps. The greater portion of the lands in question have been drained. The rest are meadows, and they are only flooded for short periods. If the flood lasts for ten or twelve hours, it does not run any longer, and it does not injure the lands at all. I have also marked on the Ordnance map here (produced) the various weirs that are referred to. First, there is the supply weir, secondly, there is a drain of mine under the river. This drains the land at one side of the river into another drain which runs away quite independently of the Stradbally river. Thirdly, there is the weir of my own mill which is a valuable property. There is a weir for the mill supply, and there is a head weir as well. In fact the land which is affected by the supply weir for my mill is more valuable to me in its present condition, than if it were drained, for it is under osiers, which are very valuable. At page 2 of the schedule I find I am first scheduled in certain lands on the townland of Knockphilip. There are about two acres of that townland affected by weir No. 5 on the list—the weir marked B on the map. These two acres are flooded during heavy floods, but that land is drained by a drain under the river, and the water runs off it at once. The rest of the townland of Knockphilip is either under plantation, or osiers.

591. As regards Knockphilip, the first townland under your name in the schedule as owner, do you object to the amount of the land there mentioned to be drained or improved, 9a. 1a. 0r. 1—? I don't object to the amount, but I object to the supposed improvement. I say there would not be any improvement.

592. You don't say the 9a. 1a. 0r. is too much?—No. I will take that as correct.

593. The present annual value of that land to be drained is put down at £7 3s. 4d.—do you object to that?—Well, I don't object to that.

594. Then comes the annual value that would be added to it, by way of improvement, if the works were carried out?—Oh, I object to that as too. It would rather be a loss—a damage rather than an improvement.

595. You think the works of the drainage would be prejudicial to you?—Would be prejudicial to me. Part of these lands is rough ground, quite incapable of being made arable or pasture land. It is under trees, and the greater part of the rest is under osiers; and the land under osiers I find is more valuable than any of the other land I have.

596. Now, we will take the second townland—Ballykilleen. The area of the land which can be improved is entered at 12a. 3a. 0r. Do you object to that?—I object to the area of land that can be improved, because four or five acres of it are under water—that is the sheet of water close to my house.

597. Ornamental water?—Yes.

598. And as that ornamental water included in the 12a. 3a. 0r. mentioned in the schedule?—I take it from an inspection of the map that it is; the water is not marked on the map—the whole is coloured blue—and the greater part which is not under water is under osiers.

599. The present value of that 12a. 3a. 0r. is set down at £7 19s. 4d. Do you make any objection to that valuation?—Well, it is very low, considering the crop which is on it, that is much less than the annual return from it.

600. The improved value which would be added by the proposed works is put down at £4 10s. 2d. Do you object to that?—I object to that as too. The works would be prejudicial to this land instead of being beneficial.

601. In the townland of Mill Land 31a. 3a. is set down as the area of your land to be improved. Do you object to that area?—I do object to it, for the land won't be improved at all. It has already been drained.

602. The whole of it?—The whole of it. It is all meadow land which has already been drained, of course it is flooded occasionally, but that does it no appreciable damage.

July 26, 1861

Sir Allen  
Walsh.

603. Do the drains at present work well?—They do.

604. But the land is occasionally flooded?—It is occasionally flooded.

605. Does that flooding arise from the river itself?—From the river itself.

606. And do you not consider that that flooding damages it?—No, not as a meadow. The water does not lie on it. As I have told you, the water never lies longer than ten or twelve hours.

607. Does the flooding ever choke the drains?—No, the land is drained independently of the river.

608. The present value of the lands 31a, 3a, is set down at £17. Do you offer any objection to that?—I don't object to the present value but I do object to the improved value. I don't see I should gain any benefit at all by the proposed works.

609. The probable increase in value to be gained by the drainage works is set down at £5 15s. 10d. Do you object to that?—I object to that.

610. There are three other townlands, Monasterick, Carradene, and Inch, and the present value of each is set down. Do I understand you to make any objection to the present valuation of any of these?—No, I do not.

611. The improved value, in consequence of the proposed works, is set down at £3 18s. 1d., £4 7s. 9d., and £3 19s. 1d. respectively. Do you make any objection to these figures?—I make objection to the increased value of Monasterick, because the lands set down as injured are all thorough drained and are really not affected by the floods of the river at all. They are all drained independently.

612. Well, what do you say as to Carradene?—It is under meadow, and it is only liable to partial flooding. I make no objection to the area or present value, but I do object to the improved value, for I don't see I should be benefited at all, or at least, beyond the most trifling extent. I suppose, if I was benefited one shilling an acre it would be the highest that I would be benefited by the sinking of the river.

613. What observations have you to make with

regard to the townland of Inch?—I think that ten or twelve acres of the lands of Inch would be materially benefited if the canal supply were removed, but not otherwise.

614. Will you explain a little more clearly what you mean by saying "if the canal supply were removed"?—There is at the lowest point of my property—at its junction with Mrs. Bell's property—a weir for turning water into the Grand Canal—I call that the Grand Canal supply. The fall at that weir is about 1 foot, or 2 feet 6 inches, and if that weir were taken away, the land above it would be relieved of water to that extent.

615. Colonel CARMEL.—But then you would take away the water from the canal?—If you took the weir away, of course, you would take the water from the canal, and that opens up another consideration. But you cannot do anything with the lower portion of the land of Inch, unless the canal supply were removed—in fact, you cannot do anything with any part of the river above that, unless that weir is removed.

616. Sir JOHN McKEILIE.—How long does the flooded water remain on the lands during the winter and spring months, below the point at which you want to retain the water for your own purpose?—Well, I don't think it ever remains longer than ten or twelve hours at a time; it might remain a little longer in a patch or two, perhaps twice the size of this townhouse; but, as a rule, it never remains longer than twelve hours.

617. Is the weir for the supply of the Grand Canal under water during any portion of the winter, that is—is it what is called a drowned weir?—It is always a drowned weir—there is always water going over it.

618. Does the back-water go over it?—In a high flood the back-water comes flush with it at both sides.

619. Is there any depth of water on the top of it at that time?—Well, there is what you might call a sort of appreciable fall, about a few inches, you know the line of the water, it comes quite up to the top of it.

620. But that is only for a few hours?—Only for twelve hours at the outside.

#### Mr. John William Young, examined.

621. Mr. BRYAN.—I believe you have some observations to make with regard to this branch of the river we are speaking about?—Yes. First of all I wish to read for you the following statement of objections on the part of my father, William Young. The first townland that he is alluded for is Brookley Park:—

"All the lands of Brookley Park capable of improvement by drainage have been drained from 3 to 4 feet deep at various times from 1830 to 1870—at the owner's expense. The outlet of this drainage is the old river which flows into the lake at Ballykloone House and the level of which cannot be lowered on account of the mill weir. Besides there would be no benefit derived from any deeper outlet as the lands affected by the drainage are all in pasture, are sufficiently dry and any further drainage would injure them."

—That is what I have to say as regards Brookley Park.

622. Well, I will put a few questions to you regarding the figures in the schedule. Do I understand you to object to the 50a, 1a, 30r set down as the area of lands to be drained or improved by the works?—I consider the area is rather too high. Perhaps in exceptionally high floods there might be that, but certainly the whole fifty acres would not be under water for more than two or three hours. There might be thirty acres under water for ten or twelve hours, but then that is very exceptional.

623. These are the drained lands you have told us about?—They are drained but what would cause them to be flooded would be the back-water. The drains are not choked up, they run pretty freely.

624. The present value of that fifty acres to be drained is set down at £47 1s. 11d. Is there any objection to that figure?—No.

625. And the probable increase in the value of the

land by the improvement is set down at £7 11s. 1d. Do you object to that?—I object to that altogether. It would rather injure the lands to drain them further.

626. Then you consider the flooding a benefit to the land?—I consider it a benefit to it for it brings down a certain amount of silt which acts as top-dressing.

627. As regards the townland of Germans have you anything to say?—Yes (reading):—

"All these lands have been drained at different times from 1830 to 1875 at the owner's cost. All the lands capable of improvement by drainage are in the owner's hands, are improved as far as they are capable of improvement and any further drainage would deteriorate them and unfit them for the purposes they now serve. Besides, no better outlet can be obtained than that already afforded unless the canal supply were lowered and the Strabally river sunk."

628. If the canal supply was lowered and the Strabally river was sunk there would be a better outlet?—There would be a better outlet, but it would be no use, as its present outlet is sufficient.

629. Is there any flooding on this land?—There is on a slight portion of it on the river, which is now known as Germans bog. All the high land is drained and planted, and what is not planted is good pasture for sheep in summer and rough cattle in winter. In the lower part of it the turf mould has been cut down to the white mud, so that it would in fact be entirely useless for farming purposes. As it is, it is most useful to us as it grows a quantity of weeds and sedge which are of great value as bedding in a scarce year, and for covering manure and turnip pits. And not only is it at present not flooded too much, but we have to keep back some of the water in

Mr John  
William  
Young

across parts of the year, say in a dry summer, when we use it more or less as a water window to make the grass grow.

630. In Gurnea the total area is set down as 650. 3r. as the amount of land actually flooded. Do you object to that?—I certainly do object to that statement as to 65 acres being flooded.

631. And twenty acres is put down as the quantity of land injured. Do you object to that area?—I do object to that, as I don't consider the land injured at all by the water; on the contrary, it is rather a benefit to it.

632. In fact you object to the assertion that the

area of eighty-five acres are injured at all?—I do. I say they are not injured.

633. And, as a matter of course you object to the £18 4s. 9d. the probable increase in the value, that is placed upon it?—Yes, certainly; for most distinctly any further drainage would damage us.

634. Then is it your opinion that the sinking of the Strabally branch of the river up to your portion would be of any benefit at all?—It would be no benefit to us whatever.

635. Colonel GARNER.—It would be injured instead of benefited?—It would be injured instead of benefited.

Mr. THOMAS KENNEDY, examined.

Mr. Thomas Kennedy

636. Mr. BURNES.—Have you, Mr. Kennedy, any objection to make?—No, but I have a question which I would like to put to the Commission. I wish to know is it part of the duty of the Commission to inquire into, or in any way take cognizance of the consideration as to who will eventually pay for the drainage: whether the landlord or the tenant, or both?

637. Yes. I think the Commission will probably make recommendations on that head; but there is a provision in the law at present, that where an occupier derives benefit from drainage works such as these, power is given enabling the landlord to recover that improved value from the tenant improved land!—That is my reason for opening up the question. Allow me to state something that has happened, to enable me to better illustrate my meaning. I happen to belong to a drainage district, and I happen to be the largest landlord in that district, the works were begun under the Board of Works, superintended by their engineer, finished and completed. The tenants on my estate, who would be benefited as a body, all signed agreements, before the works were commenced at all, agreeing to have the work carried out. Commissioners from the Board of Works came down, and held a local inquiry, at which they heard evidence. They then allocated the charge the landlord had to pay, and the charge the tenants who gained the benefits were to pay. The tenants gained all the benefit, I did not gain any. That was a court which gave a decision on those matters. But then, the Land Commission Court set in the same district afterwards. The tenants applied, as they have a perfect right to do by law, for a reduction of rents, and they went into the Land Court to have their rents fixed. There the first question raised was in reference to this charge regarding the drainage works—the charge held by the Commissioners of the Board of Works to be payable by the tenants. But now, the Land Commissioners on the other hand held that they were not to take this drainage into consideration at all, but that the landlord was to pay for it. That has been their ruling, unless it is upset on appeal. Therefore, this question of drainage is one that I am naturally anxious about.

638. Sir JOHN MCKENZIE.—Might I ask, is that a recent matter?—It is a case that occurred within the last three months.

639. But the drainage had been finished some years before?—The drainage had been finished some years before.

640. Before the Land Commission held its sitting?—Before the tenants applied to the Land Commission. It is the Hallyards district.

641. Mr. BURNES.—Have you any objections to make with regard to the figures in the valuation schedule?—No, these lands are flooded and considerably flooded, there can be no doubt of that. I have had the schedule before me, but am unable to say whether the figures are correct or not. I conclude they are correct, but I have no personal knowledge whether they are or not. With regard to the canal supply, which has been spoken of, I conclude the engineers have taken that into consideration. I

think a great deal of the flooding of this land—of the excess flooding—is due, in a large measure, to the overflow of the weir which supplies the canal, and runs at a high level through these lands. I suppose, the engineers have considered that question closely. I conclude they have. Knowing the lands perfectly well, I know that is the great difficulty to be dealt with. I have no further information to offer.

642. Your lands which are flooded, do they lie above the supply weir, or below?—They lie below the supply weir.

643. Then, I think the backing of the water from the supply weir would not affect your land?—At present it flows over my land at various places, at times, and it is a very serious matter. It has been brought before the Grand Jury by the County Surveyors. Perhaps it occurred by the overflow of the weir. My remarks apply principally to Eyne and Ballinagart, which lands are further down than the others.

644. Now we come to Straboe?—Straboe is above the weir. The only part of my land really above the weir at Larkin's Cross, in Straboe, and it is only put down as thirty-one acres flooded.

645. I should like to ask you now, having the schedule in your hand, some questions regarding each of the townlands, to see whether you object to the figures. The first townland is Delisloe, 28a. 0r. 20r., is the total area of the lands to be improved; that is the area put down of the flooded or injured lands, do you object to that?—With regard to that, I really have not made up my mind, for I have had this schedule only a short time before me. I could not answer that, and the same remark applies generally throughout the whole of the townlands.

646. That is, you give the same answer as regards the others?—Yes, the same answer, for I have not had time to look into the matter.

647. Speaking generally, do you think the drainage proposed and the sinking of the river would be an improvement to the land?—Well, speaking generally, of course it would take off the flood. I think it would be an improvement to the Trague River, unquestionably that is so, but I could not give you an answer as to whether the valuations are right or not.

648. Sir JOHN MCKENZIE.—I think you mentioned that you believed the lands were injured by the overflow from the canal?—Straboe townland above the supply is certainly more injured. It may be owing to the carelessness of the Canal Company, in not lowering their supply.

649. Then you think it may be owing to the defective state of the Canal?—Yes, to its defective state. As I have told you the matter has been brought before the Grand Jury by the late County Surveyor, when the water came along the edge of the road. Straboe is certainly injured by the high level of that supply.

650. Mr. BURNES.—But it is above that supply?—The river delivers into the canal supply at Larkin's Cross.

651. Sir JOHN MCKENZIE.—Generally you are not prepared to say whether you object to or admit the value of the improvements which are put down?—

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July 26, 1882  
Mr. Thomas  
Kenna.

My answer is, that I have not looked into the matter, I cannot say, for I found no opinion of my own on the subject.

651. *Sir Allen Walsh*.—In consequence of what has fallen from Mr. Kenna, I am desirous of supplementing my evidence; that is in reference to the question of the charge for improvements. I wish to state that the lands on the townlands of Inch and Moonsfrenak and about two-thirds of those at MDD Lands are now held under judicial rents; therefore, that it would be unfair that I should pay a charge for any improvements.

652. *Sir John McKenna*.—An opinion has been given that where an award has been made, owing to lands improved in any drainage district, prior to the holding of the Local Commission, the Local Commission would take no cognizance of the drainage at all—they would simply deal with the lands as they found them, but where the lands are improved by subsequent operations, the old power under the Drainage Act of imposing an additional charge on the tenant for improvements remains. (To witness).—Have you formed any opinion as to the effects of these floods on the climate of the district?—I don't think they are of sufficient extent to affect the climate one way or the other.

653. But is there not a large flood in winter, and a portion of the spring?—No, not in our part of the river.

654. I am speaking generally of the whole district?—I have no doubt it has some appreciable effect, but I have not sufficient scientific knowledge to say more.

655. You have not observed it?—No.

Colonel Henry  
D. Corden, D.L.

Colonel Henry D. Corden, D.L., examined

656. *Mr. Baines*.—I think you have got something to say to us about the property?—Oh! it is more a question that I wish to put than anything else. I am on the same river as Mr. Kenna, the Tringee, but I am above the Canal supply. The consequence is that the water is backed up by the high level of the Canal—it is backed up over a great portion of these lands which are now flooded, and I want to know how that difficulty is to be got over.

*Sir John McKenna*.—That is a question for the engineers.

Mr. J. Thomas  
Trench.

Mr. J. Thomas Trench, examined.

660. I wish to give evidence with regard to property belonging to Lord Lansdowne, Captain Cosby, and Mrs. Adair, on the schedule. In the first place, on page 1 of the schedule, some property is put down as belonging to Captain Cosby which really belongs to Lord Lansdowne—Ballyroolin and Tinagoe, and Big bog belongs to Lord Castleterry.

661. *Mr. Baines*.—Do both of these townlands in their entirety belong to Lord Lansdowne?—Yes.

662. That is an alteration in the schedule which of course will be effected on the proper information being given to Mr. Pezzy, the secretary—meaning any other mistakes and Mr. Pezzy will take a note of them?—I think those are all in regard to the lands which belong to Lord Lansdowne. Now, with regard to the benefit which would be conferred on these lands belonging to Captain Cosby, he desired me to state that he believed there would be no improvement by the proposed drainage to his lands whatsoever.

663. *Colonel Cadden*.—Do you mean on all of these townlands mentioned?—Yes.

664. *Mr. Baines*.—You appear here on behalf of Captain Cosby?—Yes, and for Lord Lansdowne and for Mrs. Adair.

665. May I ask you, do you think there would be any benefit to Orchard Lower—the first townland

656. *Mr. John Thomas Trench, D.L.*—As to what Sir John McKenna has just said about getting to force the old power of imposing an additional charge, under the Drainage Act, for future improvements, may I ask does not that throw on the landlord a very expensive process, along with a very practical difficulty, in obtaining a rise from tenants equivalent to the charge which has been put upon the landlord.

*Sir John McKenna*.—I am not aware that there is any expensive process. It may be done by agreement, and the tenant failing to agree, there may be an appeal to the Board of Works, who will hold an inquiry on the spot, and determine according to the circumstances of each case brought before them what the parties are to pay. But I am not aware that there is any expensive process to be at all gone through.

657. *Mr. Trench*.—But does it not appear to be a great public injustice that the landlord should be put as a buffer between the Government and the tenants, and made the means of extracting from unwilling tenants the rate, for an improvement, the benefit of which, as soon as the work is done, the tenants will certainly reap?

*Mr. Baines*.—I don't think it is within our province to answer these questions.

658. *Mr. Trench*.—May I then give some evidence with regard to some of the lands that belong to Lord Lansdowne, Captain Cosby, and Mrs. Adair.

*Mr. Baines*.—I will call upon you immediately.—Colonel Cadden wishes to give some evidence with regard to the property which we have been just talking about.

Colonel Cadden.—I know it is, but that is all I have to say.

*Sir John McKenna*.—It is also for the valuator to state whether he has taken that matter into consideration. I don't think we can go into it.

*Mr. Baines*.—It is right to say that this evidence and the questions which are put by the different gentlemen on the different subjects will be submitted to the engineer and valuator, who will have to give answers to us with regard to these difficulties.

Colonel Cadden.

Mr. J. Thomas Trench, examined.

mentioned upon the first page?—I cannot say whether benefit might accrue.

666. Do you question the figures put down in the schedule?—I offer no opinion on them.

667. That is as regards the six improved?—Yes.

668. Who is the owner?—Captain Cosby.

669. Have you any observations to offer with regard to Lord Lansdowne's other property?—You will see it mentioned on page 2?—I have some observations to make with regard to Clondragh. There would be a benefit there to the farmer, but if you benefit the farmer you will destroy the miller. There is a man there who has some land, but he also has a mill, and if you benefit the land there by draining it, you will starve the mill, so that is a matter to be considered.

670. Certainly.—We next come to Ballinastikin?—To Ballinastikin the drainage would be no benefit whatever—it is a high and dry above the river.

671. *Colonel Cadden*.—That river has been already sunk there, hasn't it?—Yes; somewhat.

672. And Ballinastikin is never flooded?—I think not. I am not aware of its being ever flooded, and certainly the greater part of the townland is entirely beyond the reach of the water.

673. *Mr. Baines*.—Speaking generally of the district, do you think the drainage of the Barrow would be a benefit?—I think, speaking generally, that it probably would be a benefit, but I think we must

how this is made, that while the land would derive benefit by being dried, it will lose the benefit of being flooded. There is a great deal of this land which certainly derives benefit from being flooded, just in the same way as Egypt derives benefit from being annually flooded by the Nile. Were it not for the Nile, Egypt would be a desert. In the same way, this land is benefited by the earth which the floods deposit. I am quite sure of one thing—that as soon as the land is drained, the tenants will in many cases declare that the land has been ruined by having the annual flooding and consequent deposit taken away from it; and I know further, that it is the opinion of a great many sensible people that the result will be simply that we should have bad dry land instead of bad wet land. With regard to the amount of benefit I think it is very problematical, it is very hard to form a clear opinion on that; but I think it would be of no benefit to the landlords whatever. I think it a decided hardship on the landlords that they should be made use of as a buffer. I think it a hardship also on the landlords that the expense of collecting this tax, which they have to pay in the first instance, should be thrown upon them. I think also it is a very great hardship to throw on the landlords the odium of collecting this tax from the tenants, whereas the tenants alone get any benefit from it. If there is a benefit, the persons benefited ought to pay direct to the Government, and the landlords ought not to be turned into a cat's paw to collect a tax which perhaps they may never be able to collect. Moreover, they have got such a lesson with regard to the money spent for drainage, the instalments of which they must pay to the Government, and which they cannot get from the tenants, that they are very uneasy about this. Now, with regard to Porteshinch and Tinschinsk, belonging to Mrs. Adair, the amount put down on the schedule appears to me to be a very large estimate. I am very much inclined to doubt that when the work is done the tenants will admit there is any benefit at all, and certainly that they will admit of a benefit to the extent of £371 4s. 11d. a year. I know that it was the opinion of the late landlord, Mr. Adair, that the benefit would not at all amount to that. I think these remarks comprise all I have to say on the subject, unless you wish to ask me any further questions.

of these two townlands is put down at £870, is that correct?—Probably.

475. Mr. BAKER.—Then it is proposed to increase that by £371?—Yes, that's more than 33 per cent. I am convinced that the tenants will strenuously oppose any such increase. I have no doubt whatever of it, and I don't believe the landlords would be able to enforce it. Besides, ever since the people of Limerick proved that an extra tax cannot be enforced, it is doubly wrong to put on this tax and set the landlords to do an impossible task, because at Limerick the people have been shown that you cannot collect an extra tax.

476. Mr. SMYTH.—These lands are flooded for some months, you say; don't you think they would be worth a great deal more than they are in their present state if the drainages were carried out?—Well, I should be surprised if they were not, my impression is that they ought, but I don't offer any definite opinion as to the extent of improvement. From an agricultural point of view I don't know enough to say what it would be.

477. It is intended to sink the river four or five feet in that locality, would not the injured lands—namely not the flooded lands but merely injured—be improved in value as well?—They might; I offer no distinct opinion on that subject. But I do not think the value of that land would be increased to anything like the amount that has been put down here, and besides the moment the work is done the tenants will refuse to pay for it. They have done that in other cases, and they would do the same here.

478. Colonel GARRAN.—In Forrest Lower how long does the flood remain?—I can not tell you.

479. Well, the present value is put down at £109, and the additional value by improvement through drainage at £70 more; that appears to be very large?—It seems, and so does it to be large.

480. Mr. DUNN.—Have you anything more to add?—No.

481. Could you give in the names of any of the gentlemen here who know the lands or Mrs. Adair's property, and Captain Conly's property, so that they can give an evidence themselves?—There are two tenants in court—I believe they are the only tenants on Mrs. Adair's property—Mr. Andrew Malone and Mr. George Bryon. I don't think there are any of Captain Conly's tenants here.

#### Mr. Andrew Malone examined.

Mr. Andrew Malone

482. Mr. BAKER.—Are you acquainted with Mrs. Adair's lands?—Yes.

483. Have you seen them flooded very often?—Yes.

484. Are they long under water?—Oh, yes, they are in a wet season—all the lands of Lower Forest and the lower part of Grange are. They continued wet for five or six years, except last year and this.

485. And that of course injures the land?—Yes, if a flood comes now, the hay would be lost for the year.

486. Do you believe the sinking of the river would benefit the land?—I am sure of it.

487. You are acquainted with Forest Lower?—Well.

488. How much an acre would the land there be improved in value by the sinking of the river, do you think?—In a flooded year I would count that land useless and fitted for nothing but wild ducks. If it was dried so that the flood would keep off it and the grass grow on it, I think the value would be increased a good deal. Lower Forest, I think would be worth 14s. or 15s. or 16s. an acre.

489. Mr. SMYTH.—That is the Irish acre?—Oh, yes, the Irish acre.

490. Mr. BAKER.—Is that beyond the present value of the lands, do you mean?—Well, as to their present

value—if they got a crop off it this year I would say it would be worth 10s. or 12s. an acre, but then it would be worth double that if they were sure of their crop. Leaving out this year and last, the land was quite useless for five or six years.

491. You hold some land yourself?—Yes.

492. Where do you live?—At Grange and the river Barrow runs along the meadow of Grange and Forest Lower—the river runs through my farm.

493. Do you find your lands much injured from the floods?—Oh, yes.

494. I suppose you would be content, if the floods were abated and the lands never flooded, to pay something more for your holding?—I would; indeed I would.

495. What is the size of your farm?—Seventy-five acres, and I have another farm above called Inagh.

496. Is that flooded too?—Yes, it is all flooded to about four acres, and there is three quarters of what I hold in Grange flooded.

497. In a year like this do you get much meadow off it?—I do, the grass is pretty good, but then if a flood comes it is no use. The year before last I got nothing at all off it.

498. The lowering of the river and the taking away of the floods, do you think that would spoil your meadow?—I think if you made the land too dry we

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Mr. Andrew  
Mason.

could break it and get a crop off it for years. I think there is a deep soil if the flood is kept off it, we could break it and let out the old discharge.

699. Colonel Cannon.—If the river was sunk four feet deep, would that be sufficient, below your land?—It would. We drained it ourselves twenty years ago. The bed of the river at the time was level with the land, almost to about a foot, and the river got closed up. We made up a subscription and laid out two or three hundred pounds upon it from Portington. Now the river is five feet under the land, with the exception of the floods across it and the old

bridges. We opened it and widened it, and it weak itself, but now it is sifting and clearing up again.

Mr. Townsend French.—Might I ask him doesn't he think that what I said about the payment, to be fair as between man and man.

700. Mr. BAKER.—I think these are controversial questions which we should not enter upon. (To Witness).—Supposing the works were done, and the river sunk thoroughly well, do you think you would be able to pay 4s 6d per statute acre for it more than you do now?—I am sure I would.

Mr. George  
Byron.

Mr. George Byron examined.

701. Mr. BAKER.—Do you know these lands of Portington belonging to Mrs. Adams?—I do.

702. You are a tenant of her's?—Yes, in Lower Forest.

703. And your land is greatly subject to floods, as the last witness described?—Indeed it is. I have land from Mr. Adams twelve or fourteen years, and I have got nothing off it for five or six years until last year. I hope to get something off it this year too, if a flood does not come.

704. Is that all meadow land?—Part of it meadow and part grazing.

705. I suppose if the river were sunk you agree with the last witness that you would reap a good deal of benefit from it?—Oh, yes, for the land is worth nothing at all now.

706. I suppose you would qualify that, as regards the present year it is worth something?—Yes, but we could not be sure of it till to-morrow morning. One night's rain is enough to flood it.

707. And last year was a good year, wasn't it?—Yes.

708. So the land is worth something if it is dry?—Yes, but it is perished on account of the flood being on it for eight months. When it remains on it all along into the spring the land is no use, it is cold and perished.

709. Mr. CANNIB.—Is the quality of the grass good?—It is not half so good as it used to be.

710. Mr. BAKER.—And that is on account of the

floods?—Yes, on account of the floods remaining on the land too late in the season.

711. Are you afraid of your land being made too dry?—Not a bit.

712. If these works were carried out and the river was sunk, would you be inclined to pay an increased rent?—I would if it was done properly, though, of course, I am paying a rent for it now, and it has brought me nothing for five or six years until last year.

713. The last witness told us 4s 6d, the statute acre would not be over much to pay in addition for the land, if improved—is that your evidence?—Oh, I agree to that if it would not be worth more.

714. If the work was done well and you found that your land was dried, I suppose you would think 4s 6d an acre would not be too much to pay for the improvement?—If I had it at a fair value. I am paying 25s 6d an acre for my land—they raised it on me four years ago. For the last year they put £2 more on me.

715. What I want to know is, do you think the land would be worth 4s 6d an acre more after it was drained than before it was drained?—I think so—I am sure of it, for it is no use now, except in a dry season.

Mr. Townsend French.—Is 4s 6d per acre the entire estimated cost?

Mr. BAKER.—No, the estimated added value, in consequence of the improvement by relieving the flooding in Lower Forest.

Mr. Matthew  
H. Fresh.

Mr. Matthew H. Fresh, examined.

716. I am agent to Lord Castletown, and I wish to call attention to some matters connected with his property, mentioned in the schedule. Now, first with regard to the lands of Big Bog. That is put down as belonging to Captain Condy, whereas it belongs to Lord Castletown. Secondly, the lands of Rahemansilla, put down in the schedule as belonging to Lord Castletown, do not belong to him. These are the lands on the Ordnance map 14. Lord Castletown has a township of that name, but it is on Ordnance map 18, and these lands are not interfered with in the land by the river. I don't know to whom the lands referred to in the schedule as Rahemansilla (page 2) belong, but they do not belong to Lord Castletown. Probably they belong to Mr. Maxwell Glase.

717. Mr. BAKER.—Are there two townlands of the name of Rahemansilla?—I am not aware of any other townland of the name; but it is put down there as on sheet 14 of the Ordnance map, and Lord Castletown has no property upon that sheet.

718. Then there is a townland called Moyana.—Is that Lord Castletown's?—No; I think that belongs to Lord Lansdowne.

Mr. BAKER.—Perhaps Mr. French can tell us doesn't Moyana belong to Lord Lansdowne?

719. Mr. Townsend French.—Yes.

Mr. BAKER.—And isn't Rahemansilla Lord Lansdowne's also?

720. Mr. Townsend French.—No, he has no townland of that name.

Mr. BAKER.—Do you happen to know to whom the next townland belongs—the townland next to Moyana, which is this district Rahemansilla?

721. Mr. Townsend French.—(After looking at the map).—Oh, no; that is not Lord Lansdowne's Moyana at all.

722. Mr. French.—It must be Lord Lansdowne's property that is referred to here in the schedule, because it is between Rahemansilla and Moyana.

723. Mr. Townsend French.—That Moyana is not Lord Lansdowne's at all. Lord Lansdowne has another Moyana; and Rahemansilla is not Lord Lansdowne's.

724. Mr. French.—The Rahemansilla on Lord Castletown's property, is up in the corner of another Ordnance sheet altogether—sheet 18. It does not appear on sheet 14.

Mr. BAKER.—We will take down your evidence, Mr. French, and have inquiries made with regard to this particular townland of Rahemansilla, taking a note that you say it does not belong to Lord Castletown.

725. Proceed with your evidence?—Now, with regard to Big Bog, it is marked No. 1, as the flooded lands—you will find it on Ordinance sheet 13. The greater portion of that is leased to the tenant, Mr. George Edge. The lease was made about eighteen months ago, for a long term, and I consider the tenant should be charged the increase. That refers to the greater portion of No. 1. There is a very small bit outside it.

726. What is the length of Mr. Edge's lease?—As well as I remember it is sixty or sixty-five years. I can send you the date of the lease.

727. Will you send that information to the secretary, Mr. Penny?—I shall do so. In Killavally all the land marked to be improved is held under a very old lease—a lease a great many years in existence—to the representatives of Bunkis. Mr. Fisher is the present representative, and I think he ought to be charged with the increased value. We have no benefit or can derive no benefit from it.

728. What is Mr. Fisher's tenure?—There is one life in the lease still existing.

729. I don't think that would constitute him a

proprietor?—Mr. Turpin's uncle is really the representative of the lands, but I think Mr. Fisher is the actual occupant. I find the increased value of the land to be from 4s. to 5s. per statute acre. I consider that a very extreme value, indeed, to put upon these lands.

730. Which land?—Borthogue, Killavally, and Big Bog. They are all very much of the same value, but I consider it a very extreme increase to put 4s. or 5s. per statute acre upon them. I object to that increased value being put upon them; and, further, I wish to say that I think this tax ought not to be levied upon the landlord. The landlord will derive no benefit from the improvement of these lands, the tenants are the parties who really will be benefited. The lands will be improved by this drainage I admit, but, in my opinion, not to the value per acre put upon them.

731. Have you any objection to make to the area of the improved lands?—No, I think that is fairly done.

Mr. Arthur Byrne, examined.

Mr. Arthur Byrne.

732. Mr. BARNES.—Where do you live?—Clontarf. Do you wish to give any evidence on the general question, or as to the particulars in the schedule?—I am put down on the schedule as a tenant of Lord Portland, but I live on the property of Mr. Richard Warburton, or rather, my father holds the place from Mrs. My father holds it in fee from Mr. Warburton, and I am tenant to my father.

733. What do you mean by saying your father holds it in fee—do you mean under a fee farm grant?—Yes.

734. Is that a grant of old standing?—It is; it was made by the father of Mr. Addis.

735. What is your father's Christian name?—Richard Byrne, of Grangar, tenant to Mr. Addis, of Grangar.

736. Mr. BARNES.—What is the date of the original lease?—I could not tell.

737. Mr. BARNES.—Have you any evidence to give with regard to that property?—Yes. The farm that I have, I have been living on for about twelve years. Shortly after I got it, the improvement which Mr. Malone described to you was made in the river. The drains were all in good running order at that time. I live just where the Triogue runs into the Barrow. Since then the Barrow has again become full, and the Triogue also. The consequence is, that the Triogue has now become practically no river at all. It is filled up to the banks, except here and there, and it is stepped up with weeds. The land, when I went there was very good—very good grazing in the summer—but since the river has got filled up, the land floods sometimes in September, and won't be clear until the following May or June. The result is, that the land is left in such a marshy state that the grass has gone off it altogether, and there is no grazing on any part of it, the flood remains so long there.

738. In the whole of your land injured?—No, I am only alluding to the flooded part.

739. How much is that? I see the flooded part is

put down here at 188 statute acres?—Well, I would say that that is pretty nearly right—say about seventy or eighty Irish acres.

740. And the injured land is put down at twenty-four acres three rods?—Yes.

741. That is about right, too?—I think that is fair.

742. And the increased value, if the drainage is carried out, is put down at £66 8s. 4d.?—I think the value would be increased by that, if not more; I would say more, for the land which is of no value whatever now would be the best land on that farm if the river was drained. It is good strong yellow soil, and if the river was drained, I am sure it is land which would make excellent tillage.

743. Do you occupy the whole of that land yourself?—Yes.

744. What do you consider would be the result of lowering the Barrow and the taking away of the floods, from a health point of view?—would it make the district more healthy?—I think it would. I often heard the doctors say that it was the lying about of the big, large pools of water in the district that caused sickness there. I heard that frequently, and I have known young people—a lot of young people round this very district—who died very young, and who were healthy men that you would have thought would have lived for a long time. I wish to add that in that district there are places where the pools of water never leave, even all through the summer, except it is a very dry summer, when they may be dried up by the sun.

745. And you believe these pools must cause a bad influence on the health of the people?—I am of that opinion.

746. Sir JOHN McKEILL.—Is your neighbourhood subject to fogs and mists?—It is, in the summer evenings and mornings, very much, you could not see across the drains.

747. Do these fogs or mists extend for any distance beyond the flooded lands?—I don't think they do.

Mr. George Ryan, recalled and examined.

Mr. George Ryan.

748. Mr. BARNES.—I believe you wish to supplement your evidence with regard to the state of health of your family?—Yes, my evidence upon that point is the same as Mr. Byrne's. I lost two of my children, and I was told it was on account of the unwholesomeness of the place. Dr. O'Neill, of this town, told me it was on account of the unwholesomeness of the place; and he wanted me to get the place opened, and to apply to the county for that purpose, but there was

no use in getting it opened, for the water had no place to go.

749. That is, there was no means of draining your yard?—That is so. Of a wet morning I would have to get a shovel and teen the water out. There would sometimes be a foot of water under the cattle. I have constantly to teen the water out in the winter, but it has no place to go.

750. Mr. HAMARD.—And in the summer does it

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Mr. George  
Byrne.

remain in stagnant pools—it remains there until it dries up in the sun.

751. Do you say that in the cattle shed you have one foot of water in winter?—Yes, at a winter's night it burrows up under the cattle, and I have been obliged

frequently to get a shovel and turn it out; and this occurs at a place that is a mile from the Barrow river. I think if the Barrow were drained all that water would be taken away.

Mr. Anthony  
Pies.

Mr. Anthony Pies, examined.

752. Mr. BYRNE.—I believe you can give us some evidence with regard to the flooding of the houses of this town?—I can, but perhaps you would just allow me to refer to the partial drainage of the river some time ago, alluded to by Mr. Andrew Neilson. That drainage of the Barrow also drains our town river—the Ouse. By having the Barrow drained, the flood from the Ouse was able to get out at once, and consequently the town was kept dry. I hold a farm close to where those two rivers join—the Barrow and the Ouse, they meet in the form of a V.

753. Who is the owner of the property that you hold?—Lord Drogheda. It is close to Mr. Adair's property—in fact there are three properties nearly adjoining there—Adair's, Warburton's, and Lord Drogheda's.

754. What is the name of the townland?—Timahinch in the barony.

755. Do you know anything about the part of this town which is occasionally flooded?—Yes. Manor street.

756. Is that frequently flooded?—I think nearly every year. A subscription has to be made up every year for the poor people whose houses are flooded. That occurred every year except last year.

757. Mr. BYRNE.—About how many houses at that end of the town are usually flooded?—About twelve.

758. Well, at the other end of the town how many are usually flooded?—I am referring to the neighbour-

hood of the Forenary?—There are a number of houses there which are flooded occasionally—they are not usually flooded within the house. There are steps in front of those houses, the water comes up to the steps and people have to cross in *assae* carts to get into them.

759. Mr. BYRNE.—That is to say the streets are flooded?—Yes, all flooded. I myself for two winters was not able to go home without getting a horse and cart to bring me. That is up at Inishowen, near the workhouse.

760. Mr. BYRNE.—Isn't it the fact that at most entrances to the town you have to go through water to get into the town?—Yes, at most of them. Close to where George Bryan lives, they have raised a foot-path one foot in height, so that the people can get into Portlough with dry feet.

761. Sir JOHN McKENLIE.—Do you consider the health of the inhabitants of the town to be injuriously affected by these periodical floods?—I mean where the floods occur, and the people are turned out of their houses?—Decidedly so. Where the houses are flooded unobtrusively so.

762. That is, the inhabitants of those houses you think are injuriously affected?—Yes.

763. Or does your observation apply to the inhabitants of the town generally?—I think it is a healthy town.

764. Do you think the town would be benefited by the drainage?—I think so, but it is a healthy town.

Mr. William  
Goff Pies.

Mr. William Goff Pies, examined.

765. Mr. BYRNE.—Where do you reside?—I have a farm alongside of Mr. Byrne, and there are forty acres of that farm that I don't see for six months. In 1862 a committee was formed and portion of the Barrow was drained. In 1874 I got £36 13s for the crop of meadow there; in 1875, I got £31 3s. 1d.; in 1878, I got 12s. 4d., and for two years I got nothing at all. Last year, again, I got £8 3s. 6d. for the meadowing.

766. What townland is that on?—Kilmauch. It is on Mr. Warburton's property, and it adjoins Glenberry, in the barony of Portlough.

767. What is the extent of your holding?—About 160 Irish acres.

768. And of that you say about forty acres are flooded?—Yes, the Triogue runs right through my place.

Mr. George  
Shannon.

Mr. George Shannon, examined.

774. Mr. BYRNE.—Have you any information to give us, Mr. Shannon?—Yes, I am agent for Trinity College, whose lands you will find mentioned at page 9 on the schedule. The Barrow flows through the lands. They are in the barony of Trillick, and the townlands are Cappabeg, Cappanerry, Moneygill, and Quarrymead.

775. Do you agree with the figures put down in the schedule, as the total amount of the injured lands?—I cannot exactly tell, but I think these figures are near it.

776. You have no reason for differing from them?—No.

777. The present value is put down at £187 10s. 3d.—do you think that is a fair valuation?—I could not give an opinion as to that.

778. And the improved value is put down at £267

6s. 6d. I think the lands would be improved that much, because they are greatly flooded. I have seen them every year flooded by the Barrow itself, and if the Barrow were drained, it would improve the lands to that amount.

779. Is there much meadow ground upon those lands?—Cappabeg and Cappanerry are grassed by the tenants, but Moneygill is meadowed whenever they can get a crop off it. They have not got a crop off it for a good while. The bottom of the river, now is much higher than the land—the river is almost entirely closed up.

780. Do you live in this neighbourhood?—Yes, in this town.

781. Are you acquainted with the district generally?—I am.

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Mr George  
Stewart.

755. Do you think it would be a great benefit to the district generally to have the river drained and the floods removed?—I think it undoubtedly would be a great benefit to everybody and to the town too.

757. In regard to Trinity College lands, is it your opinion that the tenants would not object to pay for the improvements after they were done?—I think not. They have nearly all got judicial leases lately, and I don't think they would have any objection to paying for the improvements. Oh, I am sure that there are no tenants of Trinity College who would object to pay.

754. The improved value, according to the schedule, would amount to about three shillings a statute acre; is it your opinion that there would be any objection to pay three shillings per statute acre for the improvements?—I am sure the tenants would be only too glad, if the lands were permanently improved, to pay three shillings an acre.

755. Are you aware of this town being flooded occasionally?—Yes, I have seen it flooded, and have been down through the floods. I have seen a very great flood in Manor-street, and last year some houses fell from the flood. Of course, the poor people have to leave their houses when the flood comes; besides the floods bring a great deal of dirt into the town.

756. Colonel GARDEN.—And, of course, that is injurious to the health of the town?—Yes, up at Irish-town, and there by Long Barn it is flooded. The tenants have been complaining that the water comes up to the floor sometimes. Of course that must be very injurious to the health of the inhabitants. There is no fall from the Long Barn into the river, hardly at any time, and of course if the river was drained it would improve that district.

757. Mr. BRUCE.—The gardens and town parks of course are flooded also, and they would be very much improved by the taking of the water off them?—Of course they would. Any lands are benefited by taking the water off them. Might I call your attention to page 8—the property put down as belonging to John G. and Arthur Moore, in the townlands of Rosnagham and Cloncharter.

758. Mr. SHREVE.—You are agent for the Messrs. Moore?—Yes. I think their property would be very

little benefited by the proposed drainings. The land is pretty high and has a good fall at present for the water.

759. Mr. BRUCE.—Is there a small stream running up there?—Not necessarily through that property—it runs through Colonel Garden's property.

Colonel GARDEN.—That is the Trigue.

791. Mr. BRUCE.—Are those townlands wet—do they suffer from the water; I don't mean flooded, but are they full of springs, rusty?—There are some portions of these red bog.

792. Colonel GARDEN.—But this property, I suppose, means the cut-away part of the bog at Cloncharter?—Yes, it must be—the present value is put down at £6 15s. 4d.

793. There is a stream which runs from that into the Trigue?—That is a drain.

794. Is the cut-away bog, low rusty ground?—Yes, that part no doubt is.

795. Mr. BRUCE.—Why do you say that that would not be benefited by drainage?—It would be benefited by drainage, but I don't think the Barrow drainage would benefit it, to the extent at least of £77 5s. 10d., on these two townlands.

796. Sir JOHN McKELIN.—Could you sub-drain it now?—Yes, a lot of it.

797. Could you make four feet drains in it?—I think so. There is a good fall at present.

798. Mr. HARMAN.—Could you say what fall?—No.

799. Mr. SHREVE.—Could you sink three feet or four feet drains without needing water, and as there is a fall that would take water from those?—There is.

800. Mr. HARMAN.—If you sink four feet drains would you meet with water?—I could not tell; I know that at present there is a good fall out of it, and on portions of it they are already paying for drainage done by the Board of Works. At present there is a drainage charge on parts of Cloncharter.

801. Colonel GARDEN.—But that was for the purpose of draining the bog?—There is a drainage charge upon part of Cloncharter, from itself and that takes up a good deal of it.

802. There was a drain made by the Board of Works to enable the tenants to cut turf?—There was.

Mr. Jonathan Lottell, examined.

Mr. Jonathan  
Lottell.

803. Mr. BRUCE.—Have you any information to give us?—I have eleven or twelve acres of land and they are continually flooded. They are townparks belonging to Lord Drogheda close to this town, and as I say they are flooded continually, sometimes for eight and nine months. They are without the township, but about one mile from the Square—that is they are in the townparks but outside the township.

804. Would that land be very much benefited by the sinking of the river?—It would. It is called Boylands.

805. Is it good land only that it is flooded?—No, it is all covered with rushes now, but it would be good land if the Barrow were drained.

806. And I suppose it would afford to pay an increased value if the floods were taken away?—Of course it would. If the Barrow were drained it would afford a good increase.

807. Can you give any idea of how much the improvement would be worth?—I am sure it would be worth from 8s. to 10s. an Irish acre. It is worth nothing in its present state.

808. I believe you held an official appointment in

this part of the country?—Yes. I am Barony Oss Collector.

809. And you have recourse to different parts of the country here at all times of the year?—Yes.

810. And are well acquainted with the district which is flooded?—I am, very well.

811. Generally speaking, do you believe the benefit of the district would be great by having the proposed drainage works carried out?—I am sure it would. There is another farm next to mine, of forty acres, which I am certain would be very much improved; it also belongs to Lord Drogheda—a man named Helehan holds it. It is worth nothing as it is.

812. From your intercourse with the tenants of these flooded lands, are you of opinion that they would be willing to pay more if their lands were relieved from the floods?—I am sure of it. There are ten or twelve tenants around me who would pay a good deal more for their lands if they were drained, for they can get nothing off them now; perhaps for years, sometimes, their lands are no use.

813. Where do you live—in the town?—Yes.

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Dr. William Neale, Medical Officer, Barrow.

Dr. William Neale, examined.

814. Mr. BAKER.—The Barrow Drainage Commission would be anxious to get some evidence from you with regard to the health of the district, and the influence which the proposed drainage would be likely to effect on the health of the district. You are dispensary medical officer?—Of this district, I am.

815. Could you tell us whether you have found cases in which the flooded lands have affected the health of the inhabitants?—Within my own personal knowledge there are houses in the district which at times are rendered unfit for habitation, in consequence of the flooding.

816. Do you speak of the whole district?—No; a portion only. I know of several instances in which the houses are at times rendered unfit for habitation, but independent of that, I have no doubt that the health of the district generally, and particularly in those portions near which the flooded lands are, is affected by the flooding.

817. I believe parts of the town here are flooded occasionally?—At times. Sometimes ago whole families had to leave their houses in a street here, in consequence of the floods; and some time ago we had dysentery in the district, which I feel certain was due to the flooded condition of the lands about.

818. Have you observed that the district is much subject to fevers—about the flooded lands?—Yes.

819. Sir JOHN McKENZIE.—Have you a general knowledge of the district?—Yes, that is of my own dispensary district.

820. How far does it extend—as far as Fortcharington?—No, that is the short side of my district which only goes two and a half miles in that direction, but seven miles in the opposite direction.

821. Is it your opinion that the health of the district is injuriously affected or not by these floods?—Parts of it.

822. By the malarious vapours?—I have no doubt that parts of it are—those portions which are near the flooded lands.

823. Is it your opinion that by draining these lands and removing them from the liability of flooding that the health of the district will improve?—It would improve most materially I have no doubt.

824. Would that observation apply to the town also?—It would apply more particularly to the town.

825. Colonel CARTER.—The drainage of the town, I suppose, is affected by not having a good fall?—Certainly, and the return water from the river not being able to get away.

826. Sir JOHN McKENZIE.—The town cannot be effectually drained in its present state?—No.

827. And is subject to backwater, and the sewage is thrown back into the drains?—Certainly—when there is high water on the Barrow.

828. Is there any particular time of the year when you observe the injurious effects to be more prevalent than others?—Early in the spring of last year I noticed it more particularly, and later on in the season I noticed that there was some typhoid fever which was due to the bad drainage. The water at times was very high and the flooding great.

829. And you observed the injurious effects as regards health at the season when the waters become stagnant and evaporation commenced?—Yes.

The Commission adjourned to Friday, the 17th inst., at Fortcharington.

## FRIDAY, JULY 17TH, 1885.

The Commission met at the Court-house, Fortcharington.

Present:—The Right Hon. LORD CASTLETOWNS (presiding); the Right Hon. HENRY BRUCE, D.L., Sir JOHN McKENZIE, Colonel CARTER, D.L., Mr. HUMPHREY SMITH, and Mr. J. A. CASSIDY.

Mr. PENNY, Secretary, was in attendance.

LORD CASTLETOWNS.—I declare the Commission appointed by His Excellency the Lord Lieutenant to inquire into the drainage of the Barrow and its tributaries, open here to-day, and we are prepared to receive any evidence that may be given on the subject.

any evidence that may be given on the subject.

Mr. Algernon Harvey, agent to the Marquess of Drogheda, attended.

830. LORD CASTLETOWNS.—Mr. Harvey, do you wish to make any statement, if so, you will please first give us your general observations, and subsequently the Commissioners may have some questions to ask you?—In the first place, I wish to make a correction. On page 9 of the schedule Mr. Cassidy is put down as the registered owner of Mill Farm; it should be the Marquess of Drogheda—a man named John Byrne holds a lease for forty years from 1875. As regards a question which I have seen raised before the Commission in other places with reference to the chargeability of the proposed rate, I wish to say that I regard that question as a most important one and I have no hesitation in saying that the occupier should be rated, for it lies entirely in the power of the occupier to take advantage of the work. I consider it would be most unfair to make the landlord liable, and to make him collect this rate for the Government from the occupier. Speaking generally, I think the occupier is the person who should pay that rate—it lies, as I say, entirely in the power of the occupier to take advantage of the Act to do the thorough drainage that may be necessary after artificial drainage. It seems to me, therefore, unfair to ask the landlord to bear any portion of the tax; of course in towns the case would be different—there the landlord might be rated according to his interest.

Now, with reference to the Rathangan drainage, I hope the Commissioners will see then my recommendation that that district should be made contributory to the larger work.

831. But the Rathangan drainage has been done?—It has been done as far as that district goes, but there is an enormous quantity of water thrown down on the occupiers below, which has done an immense deal of damage. I have heard of many cases in which actions for damages are threatened against the promoters who carried out the Rathangan drainage, and these persons have only waited to see what would be done in respect to the Barrow drainage, before they proceeded with their actions. I think if the Rathangan and Kildare districts were included in the scheme it would remove any cause for complaint, and would stop the damage which is being done. It would put an end to the difficulty, otherwise, I am afraid, the actions will go on.

832. These actions are pending at present then?—I won't say that they are actually pending; I don't think that the actual steps have been yet taken, but a good many men about me state that they intend to take actions. And I think that the Kildare district should be also included.

833. You say the Kildare drainage district also?—Yes. Both these schemes were opposed by Lord

Mr. Algernon Harvey.

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Drogheda at the time they were proposed, but they were carried on in spite of him. Now with regard to the improvement—the Finney river is an important tributary on Lord Drogheda's estate. To explain what I mean I would just give you one instance, it is the simplest way. One tenant holds 544 statute acres there, his seat was fixed in 1875 by Bessington and Gosh at £484; that rent was reduced by Mr. Fitzgerald—who has made the present estimate—in 1881, to £317 6s. 6d., and in his report, he, Mr. Fitzgerald, stated it is owing to the deterioration of the land by wet and that the river Finney required to be widened. He stated that 370 acres of this farm are injuriously affected and his present valuation of that holding, Derryne, would appear to suggest that the land is still deteriorating from the same cause. Now, with regard to Moore Abbey, a question was asked me privately by one of the Commissioners as to how far Lord Drogheda would be inclined to allow the short cuts to be made through his demesne—one behind the island which is known as Pigeon Island, and one at Portadown, through the White Field. His lordship said he would not oppose the one at Pigeon Island, but he would oppose the one through the White Field as being unnecessary and doing much damage to his demesne. Now, as regards the bog on the estate. There are about 820 acres of bog included in the schedule, but I don't think the increased value put down would accrue to them, save as to one bog known as Loughaber—124 acres. At Bogherbawn bog there might be a very slight improvement—about sixty acres might be improved there. Now, with respect to the fall, I think the intended fall from Moanstown to Athy seems very small indeed. It is only about one foot six and I should be glad to know if the fall has been taken advantage of to the fullest extent—if the fall has been fully utilized. I should suppose that the fall of one foot six means to the top of the weir at Athy. As regards maintenance rate I would like to know if the Commissioners have made any arrangement with regard to it. It seems to me that there would be a large increase in the charge. I don't think I have anything more to say.

834. You have looked over the valuations and the area in the schedule of the lands supposed to be flooded and injured—have you any objection to make with regard to these areas or valuations, because Mr. Fitzgerald is not here to-day and I wished to ask those questions—I was about proposing to give you skilful evidence as to all that. I suppose we shall have a further opportunity of doing so. The fall plans and questionnaires have never been before us, but we have seen the maps.

835. I am not alluding to the fall plans of the works, I am referring to the valuation schedule. On page 4 you will see the Marquess of Drogheda put down for Boghill, Co. Kildare, and the area of the lands flooded is given as 23 acres, and the lands injured at 371 acres, and the total at 394. Have you looked into these figures?—Yes.

836. And do you say the total is correct—the total of the lands flooded and injured according to Mr. Fitzgerald is 5,006 statute acres, I wish to know are the details making up that aggregate correct?—Well, I have only just glanced through these figures. Mr. Johnston, who has valued a great deal of Lord Drogheda's lands, will be able to give you surer evidence as to them. With respect to the probable increase, I would like to have an opportunity of giving you fuller evidence upon that subject; we have not had time to go into it. The area is very large, and there are something like eighty tenants' holdings affected. As regards the area I have nothing to say. I think Mr. Fitzgerald's figures are correct, or sufficiently close being correct, that we may pass them.

837. You say that the Rathangan drainage district should be included: how do you propose it should be included?—As a contributory district, on account of its having done so much damage below. There is no doubt, it does enormous injury. The floods come

down much quicker than they used to, and they stay up as long. Now we give them an outfall for their drainage by these proposed works.

838. But they have been already assessed and their drainage has gone on for some time?—Yes, as far as their drainage goes they have been assessed, but not as regards their outfall. In my opinion, all those districts which do damage to the people below them ought to be assessed. In their present condition they flood the people below them, and the proprietors above are liable to action for damage, and I think that when the outfall is improved for them that they ought to pay a certain sum.

839. Supposing they are not included, would it be your opinion that those actions which may possibly be pending, would very likely be gone on with?—It is impossible, of course, for me to say that.

840. But have you any reason to think they will be?—Well, of course, if this drainage is carried out the damage will cease.

841. Yes, it will, of course, minimize the damage to a great extent, but then supposing the drainage is not carried out?—Oh, if the drainage is not carried out, I think it is certain that there will be some actions.

842. You say there are some bogs included in this valuation of Mr. Fitzgerald's?—All those I have mentioned; there is one bog not included. There are only two bogs mentioned, Bogherbawn and Cloneybeg (which is practically one), and Loughaber.

843. What is the area of these bogs?—300 statute acres are included in the valuation—Coolshadown bog is not included. It is 164 acres. I don't know why it is not included.

844. And you say only a small portion of these bogs will be benefited?—Only two—Loughaber will be benefited, and about sixty acres of Bogherbawn.

845. On what basis do you estimate those improvements to the bogs, or why do you say they cannot be improved?—Because they are cut down to the gravel, and you cannot go lower.

846. Colonel Canham—Do you consider the drainage there is already sufficient?—It is already sufficient. I don't think they can be cut down any further. I think the charge made upon those who take the bogs is at present as high as it possibly could be.

847. What is the probable increase in the value put down in the schedule?—I think the value is put down exclusive of bogs. The valuation is put down in one lump figure without having the bogs particularized.

848. Sir JOHN McKEOWN—Have you seen the valuation book which was lodged with the maps?—I have just looked at it, but not carefully.

849. Because it gives the details which you state you have not got the means of obtaining?—In the schedule the bogs are included generally I know.

850. But in the valuation book the whole matter is given in detail, have you compared them?—No, I have not.

851. Mr. BROWN—You told us that the Rathangan and Kildare drainage districts ought to be made contributory to the expense because of the great flood of water which is thrown down upon the district here owing to their drainage?—Yes.

852. And that if an outfall were given for this water it would be a benefit to them, but surely the giving of an outfall would also be a benefit to the district which is flooded, wouldn't it?—Clearly, but I take it an action for damage lies, and, therefore, an injury has been done by the throwing down of that water from above, and therefore the proprietors above ought to pay something for getting an outfall which will save them from having to pay damages.

853. But it is contingent on their success in establishing any such action for injury that their liability to be contributory would be ascertained?—Well, it is very hard to say that, for it is impossible for me to say whether those actions will go on. I could not answer that question.

854. As a matter of fact have those districts thrown down very much increased floods on you?—Yes. I am

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Mr. Alphonso Harvey.

sure the Rathfriland drainage has. The Kildare works were made before I knew the lands, but I will give you some figures which will show you how the case stands. There is in one townland called Pollagh through which the river flows 115 statute acres of meadow in Lord Drogheda's own lands. From 1849 to 1874 inclusive these lands averaged £4 16s 4d per Irish acre.

855. You mean the produce?—The produce. We sell the meadow at foot by auction. Well, during the eight years from 1877 to 1884 they only averaged 12 1s 1d. per acre, or less than half, 1876 was the date of the Kildare district drainage, and in 1878 the first charge was made in regard to it.

856. Then you attribute the decrease in the produce to the increased floods sent down by the Kildare District Drainage?—Yes.

857. As to the new cuts proposed through Moore Abbey Demesne, there is one cut, you say, which Lord Drogheda does not wish to be made?—Yes.

858. But he will agree to the other?—Yes.

859. Which is the longer?—I should think the one he agrees to is the longer—that is the cut from the middle of the town right through the field behind what is called the Pigeon Island.

860. Is there any engineering difficulty with regard to the shorter cut which Lord Drogheda objects to?—I think not. It is simply a field in tillage, and Lord Drogheda thinks a cut there would spoil his demesne.

861. When you were speaking of the bogs which would be benefited were you referring to cut out bogs?—No, but to turloughs.

862. Surely almost all the bogs that are adjoining the flooded lands would be benefited, even the turloughs would be benefited by taking down the water?—I don't think we could get any more rent for it, and I think most of the bogs for turloughs are cut down to the gravel. They are cut down as far as there is any turf to be cut. I don't think there would be any increased value to the bogs, and I don't think that we could get any increased rent. It is different with regard to Loughbor, we cannot cut it at all, on account of the wet. There is very little of it cut.

863. Mr. SMITH.—The increased water coming down from the Kildare district, would you not attribute that partly, at all events, to the increased

rainfall we have had since 1876?—Clearly that has had something to do with it.

864. That, of course, would help the flood a good deal?—Yes, of course, the rainfall could not get away in the same way as it used. The greater the rainfall the greater the difficulty.

865. Lord CASTLEBROUGH.—The 1,578 acres which are assessed as bog, do you really think that that positively is cut down to the ground at the present moment?—In most places. They tell me they cannot go lower.

866. Have you done anything in regard to bog drainage yourself?—Yes, about four or five years ago I drained nearly all these bogs as well as I could. I borrowed money from the Board of Works, and expended between £400 and £500 upon them.

867. You say "as far as you could," that leads me to suppose that you have not gone as far as you might?—Oh, we have. The people tell me that they have cut down as far as they could. At any rate, the place is rated as turlough as high as it can be rated, and we could not get any increase, supposing a charge was levied on the bogs. As to the cutaway bog, of course, that could be converted into land and drained, but I don't think you could increase the value of the turlough by drainage.

868. Sir JOHN McKEILL.—Not even to the extent of 1s. an acre, as Mr. Fitzgerald puts it?—Well I suppose you might, but I doubt very much whether you would get it.

869. Mr. SMITH.—According as you cut the turf away couldn't the cutaway bog be ultimately capable of tillage?—Yes ultimately it would, if the drainage is done, it will relieve the cutaway bog of course.

870. And do you think that if the drainage were done it would not be worth 1s. more a statute acre which is what has been put on by the valuator?—I don't think so far as the turlough goes it would.

871. But you must remember that the turlough is being taken away and the land cleared?—Oh, it drains very slowly—they clear about 15 feet every year. The turlough is set at so much per perch along the face of the bog, and they are allowed to cut 16 feet back every year, and it would take a long time to make such land of that.

Mr. George Johnson.

Mr. George Johnson examined.

872. Lord CASTLEBROUGH.—Have you a statement to make with regard to these lands?—Yes, I have been asked by Mr. Harvey, on the part of Lord Drogheda, to give evidence in a country way merely, as to the value of some of the land which has been included in the schedule. During the past 8 years I have inspected and valued the greater part of Lord Drogheda's estate and I am well acquainted with the lands included in the schedule. A very large portion of the land lies along the Barrow and its tributaries, and suffered to a very great extent, especially in late years, from the flooding of the river and the inability of the tributaries to discharge the surface water. The proposed drainage is, evidently most desirable as regards all that district in every point of view—I think of that there can be no doubt at all. There are three classes of land on Lord Drogheda's property included—the alluvial meadows along the river; the medium pasture lands; and a very large portion of poor pasture and cutaway bog, which lies at a considerable distance—in many cases five miles—from the Barrow, and which would be benefited by large open drains. Of course, there would be a difficulty in keeping these drains in order, and the maintenance, as regards that particular portion of the estate, would probably be rather heavy. Practically, there is very little drainage on that portion now. The alluvial meadows, will, of course, be improved very much, and the medium land would be considerably benefited, but as regards the third quality to which I have referred, it is, generally speaking, situate at a considerable distance from the river, is injured without being

flooded, its drainage will depend on a large extent of open drains, difficult to keep in order. And in my opinion, the lands would be capable of bearing only a very small increase. I have gone over the schedule, and in my opinion, the estimated improved value would never be realized on that class of land.

873. Have you looked at the valuation book?—No, but I have looked at the schedule.

874. The lands have been put down at 5,026 acres, how much of that do you say would be improved?—There are 1,524 acres put down as flooded, and 3,079 acres as improved, well the greater portion of the latter are the lands that I refer to as capable of only bearing a small increase.

875. These improved lands you think would not be susceptible of bearing a great increase?—I think not. That is all I have to say.

876. Mr. CAMROD.—Would not the cutaway bogs be capable of being improved by being drained?—Some of them would.

877. Don't you think it would be a great improvement on them value if they were drained?—Yes, but it would be consequent upon considerable expense upon the part of the tenant. I think the increased value placed upon these lands is too high, in consequence of the other works which would be necessary, and which would be of considerable expense.

878. Sir JOHN McKEILL.—Have you not looked at the valuation books deposited with the maps and schedules?—No; I have only looked at the schedule. I was not aware there was a book.

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Johnson.

879. But in the valuation book the different qualities of the land are specified, and from it you would be able to form a more accurate opinion—you have taken all the lands in the aggregate, good and bad?—Yes.

880. For instance, all the injured lands are placed in *class* in the schedule?—Yes.

881. While in the valuation book you will find that these lands have been separated into lots, and a price placed upon each of these lots—that will enable you to form a more definite judgment on the question you are speaking of?—Take for example, in the schedule, Rickardstown Lower as a case in point. There, 71 acres are put down as injured, and only 6 as flooded, so that practically the amount charged in Rickardstown Lower is merely for injured lands.

882. But in this valuation book you will find that the injured lands are divided into lots, as well as the flooded lands, and according to their quality the improvement charge is proposed. For instance in the township of Killeen West, which is merely injured, have you noticed what the charge per acre is?—Yes, five shillings per Irish acre I take that all to be put at, but it is too much.

883. That is about three shillings per statute acre?—About that.

884. Well now, do you think that too much?—I do. But I should say that it was only at the last minute I was asked to look over these figures, and I have not had time to form an accurate opinion.

885. You would not say what value ought to be put on them, would you?—Well, I could not say.

886. But you think three shillings per statute acre is too much?—I do.

887. Well now take Rickardstown Lower, there the flooded lands are very small compared with the injured lands—do you think the improvement charge there is too much?—It is 6s. 6d. per Irish acre—surely too much.

888. But have you formed any idea as to what extent it would be improved?—No, I have not.

889. What is the quality of the land?—Generally speaking the land injured is poor land.

890. What is the quality of those six acres which are flooded in that township?—I could not say but you will observe that the greater part of the townland is put down as injured while only six acres are mentioned as being flooded.

891. In the Valuation Book the injured lands in Rickardstown Lower are divided into different lots. There is one lot of thirty-seven acres on which the value of the improvement is put down at 6s. 2d. an acre, do you consider that too much?—Well, not having seen the book I am not able to speak of the different lots, but I am aware that the improvement rates average 6s. 6d. per acre.

892. Why, there is another lot put down at 1s. an acre and a third lot at 1s. an acre—twenty acres. Wouldn't the outwash bogs such as have been described to be cut down as well as they can be and which are now flooded, be capable of improvement if the floods were taken away altogether?—Certainly.

893. And should not a charge be put on them?—Oh, certainly.

894. Mr. JOHN McKERRILL.—I understood Mr. Harvey to say that they could not be improved.

Mr. Harvey.—Oh, I did not say the outwash bogs could not be improved—I alluded to the turbary bogs. The outwash bogs as Mr. Johnson says, can of course be improved. I was referring to the actual turbary districts from the outwash bogs. The outwash bogs are reclaimed and made land of for growing crops which is a perfectly distinct thing from the turbary.

895. Mr. BROWN (to witness).—Do you, Mr. Johnson know this district for any length of time?—Well I do in one way—by passing through it.

896. I was going to ask you whether you could give me any opinion as to the effect which the

Rathangan drainage has had upon it?—I could not give you any opinion as to that.

897. Colonel CAMMER.—In Killeen West you say 3s. an Irish acre would be too much to put on for the value of the improvement?—I think so.

898. What kind of lands that?—Poor pasture land.

899. And what kind is the land in Blakemstown Lower?—Land of the same class.

900. Now, Baginbown Lower and Baginbown Upper which are included in the schedule, isn't a great deal of that deep bog?—Yes.

901. And would not the deep bog be benefited by the deepening of the river?—To a very small extent.

902. Are they able to cut the turf down there now?—I don't know the turf banks.

903. Can you cut down to the bottom for the turf now?—I am not aware—can you tell Mr. Harvey?

904. Mr. Harvey.—We cut as much turf out of it as we could.

Colonel CAMMER.—And you cut to the bottom?

905. Mr. Harvey.—I think we cut to the gravel. The men who cut the turf there tell me they cut to the bottom. I have no experience myself of the matter.

906. Lord CAMMERGLEN.—(To Mr. Johnson).—The sallow meadows which you mentioned, those are quite distinct from the injured lands?—They are flooded lands.

907. And these are the lands which would be likely to be improved?—I think so.

908. How that meadow very much deteriorated of late years?—From what I have been told, very much indeed—commonly I would say.

909. What do you think they suffer most from—the flooding, or the silt coming down?—The flooding, especially the summer floods.

910. Have you ever heard of cattle dying there from eating the grass on which the silt had come?—I have heard that. They suffer from "bog lambs," which is caused by wet.

911. Generally speaking, your opinion is that nearly the entire of the 3,060 acres of injured lands are not likely to be improved to the amount put down in the valuation schedule?—Quite so.

912. And is your opinion formed from having gone over the lands, and having valued them?—Yes, and from my experience in other districts of lands which have been drained.

913. It is distinctly your opinion that they would not be improved to the extent put down in the schedule?—Most distinctly.

914. And can you give any idea to the Commission as to what extent they might be improved?—That is a very difficult question, and I am hardly prepared to answer it offhand.

915. Give an approximate idea?—Well, I suppose that the average put down in the schedule would be about 6s. 6d. an Irish acre, which I think is a very high charge for giving an outfall to poor lands. I don't think they possibly could realize that sum.

916. Of course that charge refers to the drainage as well?—It does not only mean outfall actually, but it covers the smaller drainage as well?—Oh, of course, the land would probably be drained to a certain extent.

917. Yes, but supposing there are tributaries coming through these lands, it covers the expense with regard to their drainage too?—Oh, it does certainly.

918. I suppose you have no knowledge of any engineering difficulties as regards the river?—None, whatever; but from the report it appeared to me—as Mr. Harvey has already remarked—that the fall is very small from Monasterevin; I believe it is only one decimal twenty-five or 175 from Monasterevin to Athy, which seems very small indeed.

919. Mr. BROWN.—How did you make your calculation that the 3,060 acres were supposed to be improved in value, at 7s. 6d. an Irish acre?—Oh, I made the calculation roughly, merely from the schedule. I converted the amount put down in the schedule into

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Mr. George  
Johnson

Irish acres, and then took the probable increase as estimated per Irish acre.

920. But then you took that as a uniform rate over the whole 5,000 acres including the 1,926 acres flooded, which Mr. Fitzgerald states would be all improved to the extent of £1,045?—Yes.

921. And I think you told us just now that the flooded lands the alluvial lands would be very much improved?—Certainly.

922. And therefore shouldn't you have charged for them at a much higher figure?—Probably—I should say certainly, of course. They are charged for at 13s. 6d. an acre.

923. I don't see how you make the distinction—the 5,000 acres are set down to be improved £1,045?—Yes.

924. How much per Irish acre would that be for improvement?—Well it varies from 5s. to 13s. 6d.

925. But how did you classify it?—I suppose you classified the improvements to some extent?—Oh, it is 5s., 6s., 7s., 8s., and 9s. an acre and so on. I gave you the probable increase of the whole.

926. Lord CASTLETOWN.—I don't think you have accounted for the great increase in the value of the alluvial?—The principal part of the alluvial are in West Offaly.—They are Graunge, Moore Abbey Demense, Claghon, Skinnon, Fane Land, Coolra-teragh, and Old Graunge, all about Monasterevin. That is about 600 statute acres. Then again there is the townland of Pultagh nearly all meadow.

927. That is 130 acres?—Yes. Then there is Coolagh, a great part of that is meadow. A great portion of the remainder of the lands is away from the river—they don't adjoin the river at all.

928. Mr. BURNES.—An improvement of £1,045 on 5,000 acres, the total quantity of injured and flooded lands would roughly come to about 4s. an English acre?—Yes.

929. It seems to me that you have rather over-estimated the amount of the improvement chargeable on the 5,000 acres, taking into consideration the much greater improvement which would be given to the 1,926 acres flooded?—You fit down to some extent, but still a very large portion of this land is not along the river.

930. Lord CASTLETOWN.—It is not along the river at all you say?—No.

931. Of course the alluvial would be immensely improved and they are along the river?—Yes, they are along the river.

932. Sir JOHN McKEELIE.—Would any part of these lands which are now flooded and which will be entirely relieved from the floods be capable of being tilled, or would you think it desirable to till them?—Not the lands along the river banks, they are so valuable as meadows.

933. But of the large extent of 5,000 acres is there any portion that you think it would be advisable to break up and till?—Oh, yes.

934. What proportion would you say?—I am not prepared to say.

935. Colonel CARMES.—Are there any tributaries running through it?—Yes, a large portion of it would be drained by open drains and tributaries. A great quantity of land must be drained by open drains.

936. Is not the Finery up there?—Yes.

Mr. Shafington  
Smythe

Mr. Shafington Smythe examined.

937. Lord CASTLETOWN.—Have you any statement to make to us in regard to the subject of our inquiry?—My name does not appear at all on the schedule. My land appears to be absorbed between that of Lord Downshire and Lord Fortarlington, according to the schedule. It is in the King's county. Number 27, Newtown, is absorbed by Lord Downshire.

938. And what portion is absorbed by Lord Fortarlington?—Bishop's Wood.

939. You mean by absorbed that your lands have not been kept separate in the valuation?—Precisely.

940. The portion which has been put down to Lord Fortarlington, is that in the King's county or the Queen's?—The King's county. Bishop's Wood belongs to me.

941. Please give us evidence with regard to that, and we will have the mistake corrected?—I should like in the first place to endorse the protest which Mr. Harvey has made. I consider that the landholders should not be made amenable to any charge in regard to the improvements which are for the benefit partly of the tenants. I protest also against the landholders being made of collection of any assessment that may arise between the Government and the tenants with regard to these proposed works; and I go further still and say I consider that in the event of there being any maintenance charge it should be placed entirely upon the tenants. As regards Bishop's Wood I have nothing to say, except that it is mine and not Lord Fortarlington's. As regards Newtown, I find upon referring to this manuscript book, the valuation book, that the figures with respect to the flooded lands and the injured lands are entirely different from those in the printed valuation schedule. I find that the flooded lands are put down at 134 acres and the injured lands at 38 acres according to the printed schedule, whereas according to this manuscript book the injured lands are put down at 145 acres and the flooded lands at 38 acres, which is very much nearer the mark.

942. You say then in the schedule the flooded land is put down at 134 acres, and the injured land at 38 acres?—Yes, and I think it must be the reverse. The

great total here is 172 acres, the flooded is put down at 134 acres, and the injured at 38 acres. Now that cannot be actually the case, for if I take the totals, one of them has 170 acres, and his valuation is £181, he is probably one of the most heavily flooded men in the district. Another man has 9 acres and his valuation is £10. I am now speaking of Griffith's valuation. This goes to show that there could not be such a state of things as the proposition of land flooded according to the schedule.

943. Could it be that the flooding has increased since the valuation (Griffith's) was made?—I don't think that the floods have increased in comparison.

944. Not sufficiently to account for that?—No. I am not able to tell critically what the amount of the flooded land is but I can have it engineered for you. My friends are between Mrs. Linn and Lord Downshire and the Newtown river and comprises 370 acres.

945. What you wish to convey is that these 134 acres of flooded land is very likely either not sufficient or—?—No; what I say is that that amount of land is not flooded. The thirty-eight acres is more likely to be what is flooded than injured and the other—the 134 acres—is more likely to be the amount injured.

946. Mr. BURNES.—What you mean is that the injured land is understated and the flooded land over-stated?—Yes.

947. Lord CASTLETOWN.—Or else that the figures may be inverted?—Yes.

948. Sir JOHN McKEELIE.—Had you an opportunity of looking over the map?—I had not until the other day when I came here. This portion of the country was inquired into at Philipstown but I was not able to be present. I did not receive an intimation.

949. Have you since seen the map?—I saw it last Wednesday here.

950. It is distinctly marked on the map what is flooded and what injured—the flooded lands are

coloured blue and the injured lands green?—What I mean by flooded lands is generally speaking there is a dotted line showing an infant in the land on the ordinary map, I don't see that here. I know that they have given Lord Downshire a lot that I should have and I am credulous with having got what Lord Downshire should have.

951. Lord CASTLESTOWN.—I think Mr. Smythe it would be the simplest way to have you examined about this matter at Monasterevan; Mr. Fitzgerald

will be there and you can raise those questions then?—Very well.

952. Can you give us any information with regard to the flooding of the town?—I have heard a great deal about it but I think it would be better to get evidence from people living in the town and who know so much about it. My information is more of a general than a particular character.

953. Is there any other point that you would like to bring before us?—No other point.

July 27, 1864.

Wm. Douglas  
Smythe.

Mr. William Grange, examined.

Mr. William  
Grange.

954. Lord CASTLESTOWN.—Well, Mr. Grange have you got some information to lay before us?—Yes. I am a local auctioneer here for many years and I have a good deal of experience of the flooded lands in the neighbourhood. As an auctioneer I am aware of the decrease in the value of the lands. My experience extends over twenty years. Land that I used to get £4 10s. an acre for has so decreased in value that I could not get 5s. an acre for it now.

955. Is that alluvial land?—Alluvial meadows along both the tributaries and the Barrow itself.

956. Mr. CHURCH.—And is that decrease in consequence of the Barrow filling up?—Yes, the thorough clogging up of the Barrow.

957. And the tributaries also?—And the tributaries also.

958. Lord CASTLESTOWN.—What do you say your experience is?—Well, as regards the town itself, I have lived in a portion of it which was uninhabitable owing to the water running into the dwellings, which became uninhabitable for six or eight weeks owing to the flooding of the Barrow. I can speak thus of my own residence, and I can also state that in this district there were no less than 100 families similarly situated, and injured in their health by reason of the floods. Much disease in the town and neighbourhood has been attributed to the floods. There has been a great deal of rheumatism, which has become quite chronic in this neighbourhood owing to people living during the whole winter months with six or eight inches of water up to their houses.

959. Sir JOHN McKENNELL.—What do you attribute the depreciation in the value of the meadows that you have referred to?—To the water.

960. But haven't they for many years been subjected to be flooded?—In my experience the Barrow was never so choked up as it is at present. It has become choked up by neglect, by timber falling across it, and hundreds of impediments all along the line so that the water cannot get through at all; then the silt comes down, lodges at certain places, and a mound is raised so that you can walk nearly dryshod in many places across the river.

961. You spoke of only a few years ago you were able to get the higher prices for those meadows?—Yes, only a few years ago.

962. And now you can only get nine shillings an acre?—Within the last four years I could not get nine shillings an acre for what I used to get four pounds an acre for. Before the Land Commission, and also before the Appraisal Court, these lands were mentioned, and considerable reductions were granted, owing to the great loss the people sustained by reason of the flooding of their meadows.

963. How does it come that the Barrow has been so remarkably destructive in the last few years, when we know that it has been running so far ago?—I cannot account for it, except that more silt is brought down, and chokes it up. When I was a boy there were plenty of places in the river about here where you could bathe, but there is no such thing at all now. These last two summers the bed of the river is so high and dry as the land all about it, and when a flood comes down it rushes all over the land, and cannot get away.

964. Do the winter floods remain long on the lands?—A great deal longer than they used.

965. And are they subject to summer floods?—Oh, it was the winter floods that ruined the grass. They rotted the roots of the herbage, so that there was nothing for next season's growth.

966. Are the lands which are flooded for a long period in winter or spring more subject to summer floods than formerly?—I think it is the winter floods that do the most harm. We have not experience much of the summer floods, but we have had very long floods in the winter, and the water runs into the houses and remains with us for weeks. But that does not occur in the summer.

967. Mr. BARNES.—You spoke of 100 families being subjected to having their houses flooded?—Yes, I am sure there are that number.

968. All in the town?—Yes, in different parts of the town, in the low-lying portions.

969. Do you know anything about the sewerage of the town—are there sewers in it?—There is a canal or cut from one side of the river—it runs through the town from one part of the Barrow to another; but it is very much choked up and stopped, and it wants a thorough good cleaning for the sanitary improvement of the town, decidedly.

970. Having regard to the state the river is now in, is there a sufficient fall for making new sewers?—Certainly not. There is no fall at all. It is a dead flat, and the river is quite as high as the land on each side. There is no outlet at all for the water to get away, and there is no use in attempting, for sanitary purposes, to drain Portlough until the bed of the Barrow is lowered.

971. Colonel CAMERON.—You say that the value of the letting of meadow by auction within the last few years has come down from £4 to 5s. an acre?—To 7s. 6d. and 2s. I sold a lot of meadows at Derrylin at that rate about three years ago that I formerly got £4 an acre for.

972. In a dry summer, like last, these kind of meadows would be of greater value, last summer there was a good crop of meadow, surely they were not let for 5s. an acre?—Oh, last year we could get £1 an acre; but you would pity the people who got the meadows to see them looking for them—trying to collect what was on them. Last year the average was £1 an acre for what we used to get £4 for.

973. Is that an account of the sand and dirt thrown down on the river because the winter floods, which won't remain very long, will improve the land more than injure it?—Former floods ruined the roots of the grass, and they are slowly recovering. They may be better this year than last and be better next year than this, but certainly they are very bad even at present. My experience is that the alluvial fields are not at all what they used to be.

974. In a sanitary point of view, you consider the state of the Barrow at present is very injurious to the health of the town?—No doubt of it.

975. Lord CASTLESTOWN.—As you have long experience in the district, can you say whether the floods have increased at all—practically has the condition of the country got worse?—What we complain of is, that the water runs over the country quicker—the flood

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Mr. Walker  
Grange

comes down from its source and floods it much quicker than it used to, and remains with us longer. It remains a great deal longer. Now, I have been speaking to a number of men about the tax proposed to be levied on the occupiers. They think it would be ruinous to put 9s a statute acre on an improvement. That would be equal to 15s on Irish acre on lands at present only able to bring £1 an acre as mowing—land that would produce nothing at all worth while to pay a landlord for. It would be ruinous to put such a tax on.

976. You think the rate would be too high?—  
Extremely too high.

977. Have you any idea of how the rate ought to be struck?—Well, having regard to the fact of there being a question that will benefit the whole three Kingdoms, something should come from some central fund that would relieve the people from the tax. If the proposed tax were put upon them it would leave them nothing at all out of their land, and I don't see how it could be borne by the inhabitants.

978. You think that the drainage ought not to be done by assessing the value on the land?—You must put it over a larger area if you tax the people. The work will be a benefit to everyone. It would be a pity not to drain the Barrow, even if there is a tax, for it will benefit the whole community. Within five miles of the Barrow all roads will be improved and benefited by it.

979. Sir JOHN McKENNA.—Do you think the injurious influence of the floods extends beyond the flooded lands?—No doubt of it.

980. How far would you say?—Four miles. I have land on a tributary four miles from the Barrow, and I would be satisfied to pay a tax.

981. Though the lands are not flooded?—Yes, occasionally they are by the tributary.

982. Supposing there are lands not flooded by the tributaries, or injured by the flooded waters, would you propose that they should be charged too?—Decidedly, what benefits one man in a district benefits his neighbours. In a sanitary point of view, and in every other point of view, you make him better. You can give the labourer more for his labour and work than you could have done, and, thus being a universal benefit, every man in the neighbourhood, for others around the Barrow, ought to contribute towards the expense.

983. Mr. GASTOR.—You think the area of charge ought to be extended, and that it should be extended even beyond the area injured?—Certainly.

984. Sir JOHN McKENNA.—Do you know anything about agriculture?—I am a farmer myself.

985. Do you think any of these lands now flooded or seriously injured could be tilled?—It is a question whether it would be better to till them. Tillage is hardly a well paying thing these late years. But it would be well to improve the lands, so as to be able to turn the benefits of them in good condition.

986. Therefore I ask the question, that the question of giving of additional employment to the labouring

classes would, of course, arise if the lands could be tilled?—No doubt of that at all. It would be a great benefit for the men who have small holdings that they could be sure of their little crops. On one township now, there is a man that I know who sowed a crop, and he is not sure that he will ever see it. Sometimes down comes a spring flood and the land is inundated before he can till it, and if he can till it, before he can get the crops out of it, down comes the summer flood and destroys the whole crop, and that is at a place within three or four miles of us.

987. Do you think the draining of the lands from floods would improve the general health?—Certainly. When men in this district reach a certain age, they all complain of pains in their bones. I really think it is from sleeping with the water so near us.

988. Is that only in the town, or in the district?—In the district even in the highest lands that have been flooded.

989. Do you think the poor's rate would be affected by the improvement?—The whole community would be benefited by the drainage of the Barrow, and the health of the whole district would be better. It would be greatly better to pay a tax than to pay the doctor.

990. But don't you think the effect of the improvement might be a reduction of the poor's rate?—I have no experience of what the effect might be on the poor's rate.

991. Mr. BURR.—Don't you think, if the drainage was done, it would add greatly to employment in the neighbourhood?—Unquestionably. It would give agriculture an impetus. Men of small holdings might begin to till, which they have not an opportunity of doing with safety now, and won't have till the land would be dried.

992. Those lands with a depth of soil on them at present and which are flooded, wouldn't it be an advantage to break them up for a short time, and put a good quality of grasses on them?—Yes, you could make them then as good as any other land you have. You would have to wait for the thing to improve, but take away the water, and by topdressing you can improve all that land. Only take the water away from it, and it will in time improve, and if you put manure into it you will soon have it as good as any other land you could have.

993. Mr. BURR.—Do you live in the town?—I do.

994. As a resident of the town, do you think it would be fair to impose a tax on the property in the town, for the benefit that would be derived by the drainage of the Barrow?—I do say that there should be a house tax.

995. You would be content yourself to pay?—Decidedly I would.

996. And are you aware of the opinion of your neighbours on the subject at all?—I did not hear any object to it, but it should be a moderate tax.

997. Is there a Town Commission in Portlough?—No.

Mr. James  
Seymour  
Sullivan

Mr. James Seymour Sullivan examined.

998. Lord CASTLETOWN.—Will you kindly state what have to say, Mr. Sullivan?—I can corroborate all that Mr. Grange has stated as to the vast improvement it would be to the locality at Portlough to have the Barrow drained. It is the greatest drawback we have here in the winter time; there is hardly a house, except those in the highest part of the town, free from floods, and even the gardens of those are affected. There are one or two observations I wish to make with regard to the schedule, in reference to Derivates in the King's county. There are 85 acres put down in the schedule as being injured, but there is not nearly so much. I made a drain myself there last year and the year before. I say so I thoroughly drained the place, leaving a drain of about three feet

under the surface. A tributary of the Barrow runs along there, and, of course, the drainage would improve the district generally.

999. What is the tributary called?—The Bogtown river, it comes from Mr. Jennings' place. Well, as regards Bogtown, it is stated in the schedule that there are 94 acres flooded, why there is none at all of Bogtown flooded, although there are some injured lands. My father had a thorough chain made there some years ago under the Board of Works, but it is not sufficient for the whole country round.

1000. Does it work well?—It does work well, but it requires to be kept open. So long as it is kept open it is sufficiently large to carry off the water which comes there.

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Mr. James  
Bryant  
Secretary.

1001. Do you find the back water come up at all?—No, there is no back water at all. The place is four miles from the Barrow.

1002. But it is included in the schedule?—Yes.

1003. Having regard to that drain you spoke of, I suppose if it were cleaned and the Barrow sunk itself slightly, it would make the land up there thoroughly good in every way?—We can get full enough.

1004. Do you think it would cause an extra improvement?—Well, I think that once you go three or four feet under the surface it is good enough for any agricultural purpose, for tilling or otherwise, and these drains are sunk three feet.

1005. You don't believe you would reap any additional advantage at all by that drain being cleaned out?—I say we would. There would be an advantage most decidedly. It is not efficient as it is.

1006. Do you object to the rate that would be put on?—Oh, yes, that is the only thing I do object to. The rate is too high, and it is based on the calculation of so much for flooded and so much for unflooded lands, but there is no such thing as flooded lands at all there.

1007. You have seen that the increase is about 4s. an acre on Dertent?—Yes, but I would say it would not realize that much, the increased value would not be worth that. There might be about ten acres increased in value to an acre, but the injured lands would not be improved to that extent. I made a drain myself last year with the trenches, and that drain would be quite sufficient to drain the land if it was kept open, but there are some signs in it now and they have caused some back water, otherwise that land would be sufficiently drained.

1008. Is there any other point you wish to bring before the Commission?—There is no other point in connection with our own holdings. I wish to say, however, as regards the town of Portlinton, that it would be absolutely impossible to make proper sewage works without a fall to the river. We have no fall at present.

1009. Mr. BATES.—Do you live in the town yourself?—Yes.

1010. Are you acquainted generally with the opinion of the inhabitants of the town upon this point?—I am pretty well acquainted with it from speaking to them.

1011. Would it be objected to if a tax was put on the town property for the benefit derived from the Barrow drainage by the owners of the houses?—I make a tax on the property?—I don't think it would be objected to. I am almost sure it would be agreed to, provided the tax was not very heavy; in fact, I am certain it would be unanimously agreed to, if it was a slight tax.

1012. The Sanitary Authority is the Board of Guardians at present, is it not?—Yes.

1013. Has any application been made to the Board of Guardians for an increased improvement in the sewerage of the town?—There has been.

1014. And what has been the result?—The fact of the matter is, that they applied to me to improve the sewerage in my holdings, but I could not possibly improve it. All we could do was to fill up some places, and as regards making a main sewer, it could not be done.

1015. I don't mean making sewers; but has there been any proposition made by the Sanitary Authority for improving the system of sewerage in the town?—No, not a thorough system. We had some sewers made, but they failed through the Barrow flooding. The floods brought the sewage back. In the summer time the sewers worked well enough, but when the floods came they brought back the sewage and silt and everything else.

1016. Therefore, it is absolutely necessary for a proper system of sewerage in the town, that the Barrow should be lowered?—Most decidedly. Except for surface sewerage the present system is of no use or value whatever.

1017. Colonel CARTER.—Then you think that for the purpose of the sewerage of the town it would be necessary to deepen the bed of the Barrow?—There is no means of thorough drainage of the town as long as the Barrow is in its present condition. When a flood comes the sewage is thrown back again into the sewers—the flood comes the sewers to fill up, and leaves them very little use, after a short time they get choked up. I would say that the bed of the river could be lowered three feet, by opening the river and removing the obstructions which throw back the floods more than anything else, and causes them to remain longer in the river, a great deal could be done. Now, at Captain Bowen's place there are some islands which have been growing there for the last eighteen months or two years, and they have stopped up the river completely, at a place where I know there used to be six feet depth of water.

1018. You are aware that several representations were made to the Board of Guardians, about the unsanitary state of Portlinton, in consequence of the state of the Barrow?—Yes.

1019. And the Guardians could do nothing in consequence of the condition of the Barrow?—That is so. I made one or two sewers but they were rendered absolutely useless on account of the Barrow.

1020. Mr. SMITH.—I think you and your mother own a great many of the respectable houses about here?—We do.

1021. And you would be satisfied to pay a small rate for the improvement?—I would be satisfied. We would be very glad to pay if the drainage scheme was carried out.

1022. Lord CAMERON.—Has the health of the town got worse of late years or not, within your knowledge?—Well, from my own knowledge the town is a very unhealthy one owing to the flooding and the damp atmosphere.

1023. Of late years have the floods increased—have they risen further up in the town so as to reach the cottages and gardens?—Yes, and even in the street here, outside the court-house. It has been every year getting worse and worse.

1024. Have there been special floods of any great height?—The highest flood I have seen was three years ago.

1025. Was there a bad flood last winter?—I think the one the winter before that was the worst one and the winter again before that.

1026. Those were very wet years?—Yes; and the floods remained on the streets longer. We had to get boats in the streets to bring the people from house to house and take them back and forward. Drailays would be almost swimming; when carrying persons they would be hardly able to wade through the flood, horses would be up to their bellies and persons could hardly sit upon the sides of cars.

1027. And how long would that state of things last?—Nearly a fortnight at one time.

1028. Has the silting up of the river got much more pronounced of late years?—Very much more.

1029. Is it noticed specially in any particular parts?—Oh, it is carried away into the centre of the fields adjoining—this thin sand. If not to the centre, considerably far into the fields.

1030. But I think you mentioned some special points of obstruction—above the bridge?—Yes, above the bridge is one.

1031. And you say there are islands?—Yes, islands. That bridge is a good example of the state of the rest of the river.

1032. What other places are there obstructions at?—Oh, there is another at Captain Bowen's place below the town, and several others, caused by the falling of trees across the river. These shortly become sandbanks then grassy and in a short time you have an island.

1033. And have all these obstructions arisen in your

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Mr. James  
Seymour  
Sculman

lifetime 1—Oh, yes. When I was a boy we used to have regulars here and boating along the river.

1033. So that all these obstructions have grown up since you were a young man 1—Yes, they have grown up almost entirely within the last ten years.

1034. How did they begin 1—They began just as a small sandbank. I remember when we used to go and bathe in places where there were six and seven feet of water and now you can cross the river at the same points without wetting your feet. The silt comes down,

catches something in the river and then begins to grow wonderfully in size.

1035. If those obstructions in the river were removed do you think the Barrow would come back to its normal state 1—Oh, if those were taken away there is no doubt whatever it would—that is if they were all taken away. These obstructions are becoming very numerous. It is an succession of sandbanks along the bed of the river.

Mr. George  
Woods  
Mammall, Esq.

Mr. George Woods Mammall, Esq., examined.

1036. Lord Castletown.—Do you wish to give us some information, Mr. Mammall 1—Yes I only received this schedule late last night. I wish to refer to the last item on page 2, number 30, in the county Kildare. Chromore, the schedule sets out at 35s. 1d. doled, and 47s. 7d. 20s. injured. I am unable to apportion these lots on the different tenants who hold them, but I am able to say that no part of the land could be properly described as flooded. The lands lie upon the meadow river Bavegue, which divides Kildare from the Queen's County. Occasionally the floods sweep along the Bavegue into the Barrow, but they don't lie on that part of the land at any time more than is necessary for them to run off. The valuation put upon a great part of the lands described here as flooded is quite erroneous too. The present value 10s. put on them by the valuator is based on I don't know what figures or estimate, and he adds 3s. an acre as the increased value which the drainage would create, bringing it up to about 41 an Irish acre, a rent which is about equal to the best upland upon my estate. Within the last two years the Land Commissioners had out case on my property where a tenant paid me £194 a year for seventy-nine or eighty acres. The Commissioners reduced it to £34 a year. That was for land capable of growing wheat, this is bottom pasture which could be mowed on particular periods in the month of August, but 41 an Irish acre, the rent put on it by the valuator. I say is one impossible for any tenant to pay, or any landlord to get. The report states truly that I have several times, twice at my own expense, and twice with the assistance of neighbours, sunk the Bavegue river to the outfall into the Barrow, and that it had a sufficient fall to make it effectual. That is quite true. On two occasions I sank it at an expense of something like £50, on another occasion I was joined by Mrs. Gratian-Bell, and on another occasion it was done by Mr. Dunne, who is the lessee of the land. Between me and the Bavegue, in the county Kildare, there is an absentee owner, and he would never contribute anything, consequently I had to do it myself. For two or three years after the sinking, no water has run on these lands which are described as flooded, they are raised two or three feet above the water level of the Barrow; but they are injured I am quite prepared to admit by the Bavegue, which is held back. In one of my sinkings I was joined by Sir Allen Walsh, whose estate adjoins mine up at the canal. Under these circumstances I am only here to say that, having only got this schedule late last night, I am unable at present to apportion these acres to the different tenants, but I would be quite prepared to give you a schedule of the rents that the tenants pay per Irish acre. I say, that the value of 10s. per statute acre, with an increase of 3s. or 2s. 6d. making it at the rate of 41 an Irish acre, is putting upon it a valuation which could not, in the shape of rent, by any possibility be got out of those lands. These are old bottom lands. They were young outside in summer and in certain seasons they give a fair bottom meadow, but I repeat that it would be impossible for tenants to pay 18s. or 41 an acre for them. I would like to add, in consequence of what has fallen from Mr. Hervey today, with reference to the obnoxiousity upon the landlords. In another county, where I reside

a public drainage was carried out to an extent which cost £24 18s. 2d. with £14 15s. 11d. for maintenance a year upon my estate. I protested against it from the first, as being totally excessive. The Drainage Commissioners, under the Board of Works, held an inquiry, my tenants were represented by counsel, and of that £29 12s. 1d. a year they succeeded in placing £48 2s. 9d. upon me. Now, for that £48 2s. 9d. a year, I can never by any possibility receive forty pence. As to the £51 2s. 6d. which is chargeable on the tenants, I find the greatest possible difficulty in obtaining anything in regard to it from the tenants, they show the greatest unwillingness to pay anything, and, in fact, think that I should pay the whole £29 12s. 1d. I have no doubt that if the Barrow drainage be perfected, when the landlords like myself come to ask the tenants to pay an increased rent, whatever it may be, probably half the sum charged, we shall be told that the improvement is nothing. Now, with regard to the lands mentioned in the schedule here, I have to repeat and I submit that the valuation is entirely in excess, and that it is an entire misapprehension to say that any portion of it is flooded land. It is only flooded at most for forty-eight hours, and that only on occasion of excessive rainfall.

1037. Sir JOHN McEAMON.—Respectively of the present value put down by the valuator, do you think that a charge of 3s. per statute acre would be too much for the limited improvement which you admit would arise 1—Until I would see what the improvement was I could not say how that would be. The Bavegue is a very slow sluggish stream; its course is impeded by reedy grass, sedge, and reeds, and where that sedge is taken away there is a perfect sweep of water down to the Barrow. In two years the sedge fills up again, but when it is once more removed the course of the river is quite free. I have done it myself from the river boundary to the canal tunnel where my property adjoins Sir Allen Walsh's. I did that all—190 pounds, at a cost of about £40, and for two years after there never was a drop of water on the estate. It is a subsequent year I was joined by Mrs. Gratian-Bell, and the same result followed. So that really unless you could tell me how much the bed of the Barrow is to be lowered I could not say what the improvement would be.

1038. The river you refer to is a meadow river between your property and the others 1—Yes, it is also the meadow drain of the county, dividing Queen's County from Kildare.

1039. But if the drainage of the Barrow were carried out, the future clearing of that drain would be taken off the proprietors—it would be sunk to a depth that would be quite sufficient to relieve the flooded lands, and also give an out-fall for thorough drainage of injured lands, of four feet. That is what the valuator has calculated upon, and that is why he puts down in his calculation an improvement of the flooded lands at the rate of 3s. an acre, while what he calls the injured lands he puts down at 2s. 6d. an acre statute 1—but I don't know how he has arrived at 10s. per statute acre as the present value.

1040. But that does not at all affect the question of the charge for improvement 1—Well, I cannot speculate on what the improvement would be until it is done. It is quite possible that an improvement equal to 3s. an acre might be made, but it would probably bring

land which is now worth 8s. or 9s. an Irish acre to 10s. or 11s., probably 30 per cent. of an increase.

1041. Mr. BRIDGES.—Does the Ravage flow into the Barrow near Bert?—It is a mile and a half above Bert—it is at the top of Mr. Bolton's estate. I should have stated that more than thirty years ago I brought Mr. Brimington there and had the levels carefully taken. He laid out a new cut instead of the Ravage. This new drain would go from end to end, so that it would enter Mr. Bolton's estate and be carried through it to the Barrow, about a mile lower down than where the Ravage debouches now. An estimate of £367 was prepared, and I was quite willing to have the works carried out, but I was not by a tenant of Mr. Bolton's—the man is now dead—who asked me what was to be got if he allowed this drain to go through his lands. I told him he would get the benefit and would not be asked to pay anything, but he replied—"If I don't get £30 I won't let it go through." Then I said I would turn my attention to the sinking of the Ravage.

1042. At the junction of your land then there would be a sinking, I see, of about nine feet, I suppose by a smaller sinking your land would be completely relieved?—Oh, half of that would do—half of nine feet.

1043. What kind is your land, is it black peaty land?—No, it is cold bottom peat, showing the peat in different places. There is no peat on it.

1044. What kind is the upper portion of it?—The upper portion is not flooded. It is sharp gravelly land; excellent land for wheat and barley.

1045. I mean the injured portion of the land?—Oh, it is that tough soil, showing merely grasses, making very indifferent meadow land, but fair land for rearing young cattle during summer.

1046. But that class of land would be very much benefited by being relieved from water, and the fertility of flooding, would it not?—Of course, any lands are improved by being relieved from flooding.

1047. But that class of land especially?—No, I think not; I don't think it would derive anything like the same benefit that rich alluvial land would derive.

1048. Colonel CARMEN.—Is that healthy land for young cattle?—Yes, I never knew of any disease on it.

1049. Do I understand you to say that the Land Commission valuers valued that good land of yours, which you say is fit for growing wheat, at eighteen shillings an acre?—Rather more; I think, about eighteen-and-sixpence the Irish acre.

\*1049. And the value which Mr. Fitzgerald puts on these lands which are to be improved is about seventeen shillings an acre?—Twenty shillings. He says that the flooded lands will be improved three shillings an acre, which would bring the figure up to twenty shillings the Irish acre.

1050. That is, it would be about equal to the value of the good wheat land?—Oh, that is a rent that could not be paid, and any attempt to levy such a rent would, I think, create a rebellion.

Mr. Thomas Coble, Portlannington, examined.

1061. Lord CASTLEBROWN.—Have you any information to give us?—I wish to speak of the sanitary condition of the town as a member of the Sanitary Board. On many occasions complaints have been made to our Sanitary Board regarding the making of sewers and having the sewers cleaned out. We sent our Clerk of Works to visit what is called the old canal, which runs through the town, and is used as the main sewer. It is covered up, but it is nothing less than a stagnant pool under the houses. It won't carry off the sewage for this reason, that the Barrow sends it back again; and, besides, the river has it nearly filled up with sand. The result is that we cannot do anything with the sewerage of the town. The Local Government Board wrote to us repeatedly, but we could not do

1051. Lord CASTLEBROWN.—You stated that you spent forty pounds in taking the sedge out?—Yes, on my first essay.

1052. How long ago was that?—I should think about five and twenty years ago.

1053. Have you spent any money on it since?—Oh yes, I have had it done on three different occasions, and I complained rather bitterly to the trustees of the Crutian-Bellaw estate, and to the late Mr. Durne of Ballymanna, that it was very unfair that they should not help me. On one occasion the trustees of the Crutian-Bellaw estate gave me a subscription of twenty pounds. It was done three or four times within thirty years. I think it could be done from the outlay of the discharge into the Barrow, up to the tunnel under the Canal, for about in round numbers, forty pounds. It is chiefly drugging.

1054. Therefore, if it has been done four times in thirty years, you must have spent £120 upon it?—Myself and others.

1055. If the Barrow was sunk to the depth proposed, it would not be necessary for you at any future time, to go to this expense, and would not that increase the value?—I think the rich alluvial lands are capable of almost any improvement by drainage, but I think cold bottom lands like these are not by any means capable of the same improvement.

1056. From your experience of them are these kind of cold lands very often benefited by drainage or the reverse?—Well, I don't say they are worse, but there is a period between, when the old grasses are dying out and the new grasses, more attached to a drier soil, are coming on, to which what I heard today regarding meadows applies strongly. The land for a few years is worse. The lands would require to be tilled. There would be great difficulty in tilling this low land, which is all grass land. I will be able to give the Commissioners a schedule of the rents per acre that I get for it.

1057. There would be additional expense after the drainage to till this land?—I would not contemplate that at all; I would prefer to bring it round by topdressing. I think tillage would be a complete failure.

1058. Your opinion distinctly is that the valuation put upon your land is not the correct one?—I think it is excessive, and I think it is a misdescription to describe it as flooded, except under the most exceptional state of affairs. The floods remain on the lands only for a very brief period, and it is only in the case of extraordinary excessive rains there could be anything like permanent flooding there.

1059. And in order to maintain the state of things which exists you have to cut the sedge away?—I have. It is a very strong river, and that should be done nearly every year.

\*1060. Don't you think the land would be benefited by the proposed drainage to this extent—that the effect of carrying out those works would be to relieve you from doing that clearing out?—Certainly; it would be a great benefit.

anything until the bed of the river Barrow is sunk. Some time ago we made a sewer to improve the town at the King's County side, but the river throws the sand back into the sewer, and in a few years it will be useless, so that we will have to do the same thing over again. During floods the condition of things appeared to be that, that the inhabitants could not cross the street except in boats. I have seen the flood so bad that a cart had to be kept employed to carry the people on towards the King's County part. I have seen all the people in Spahane obliged to leave their houses in consequence of the flood.

1062. Mr. CARMEN.—Are you the owner of any houses in the town?—No; I am a guardian for this part of the town, and therefore I think I ought to be

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Mr. George Woods  
Monmouth, &c.

Mr. Thomas  
Coble.

July 27, 1885  
Mr Thomas  
Cobb.

interested in getting any benefit for the town I think necessary. I believe it to be absolutely necessary for the health of the town and the comfort of the inhabitants to have the Barrow lowered. I don't believe there is any place along the whole line of the Barrow which is as badly off in regard to flooding as Portwillington. I don't know how, in a civilized place, such a condition of things was borne with so long.

1043. Lord Castlemore.—Do you think it is the opinion of the inhabitants that they would be willing to bear a rate for the improvement of the river?—I have never heard any objection to paying such a rate, for it is absolutely necessary for the health of the town and the comfort of the inhabitants to have the work carried out. A large shopkeeper, to whom I spoke on the subject, told me he would be glad to pay a rate. Where you have a street flooded, and the yards flooded, and the refuse and sewage cannot get away from town, it is a state of things that must contribute towards pestilence.

1044. Mr. Barnes.—You know the town a long time?—I was born within two or three miles of it; I know it ever since.

1045. In your opinion, have the floods much increased in height?—They have. In the last three or

four years they have increased. They were not so high last year, for it did not rain so much, though the street was flooded last year.

1046. Do the floods come down oftener than in former years?—It does, because there is not the same fall. The sand is brought down from the mountains beyond Mountmellick, it curls round anything that catches it in the water; then another lot curls above it, and so on till there is a bank. A little above the bridge you will see a bank. The fact is, the water could not get away from this town at all were it not that the people draw all the sand they want for building purposes, out of the river bed. The river would be stopped altogether only for that. Colonel Carden, the Chairman of the Sanitary Board, knows that the Local Government Board wrote to us, but we could do nothing.

1047. Lord Castlemore.—Is it your opinion, as a Guardian, that the people would not mind the imposition of rate at all?—I don't believe they would. The people are willing to do anything that is fair. They know it is necessary to have the town drained, and therefore, they would not object to pay a fair rate for it.

Mr Sidney  
Jennings.

Mr Sidney Jennings, examined.

1048. Lord Castlemore.—Will you kindly make any statement you have to offer?—I wish to speak about the condition of the town of Portwillington, in the first place. I lived in the town for sixteen or seventeen years, but left it about four years ago. I can corroborate a good deal of what the other witnesses have stated, regarding the town, and I can say something in addition. There are very few houses indeed in this town, save those that are on points of commerce, that are not flooded by the river Barrow, to this extent, at least, of having the flood water in their basement stories. At the Palace Barrack, at the Queen's County side, I have seen ten inches of water in the lower story, and necessity for hauling this out. As regards the question of sewerage, it is utterly impossible to have an effective system of sewerage in the town under the existing state of things. The Local Government Board, I think, did something in the way of preparing maps of sewers, but the project fell through. It could not be carried out, because there is no fall for the sewers. There are only two sewers to my knowledge in the town. They intersect the main street, and I think they are ancient nuisances instead of being sewers. They only accumulate foul matter, and unless they are cleared out properly (which does not very often occur), it must be a source of very great danger to health. Now, as regards the flooding, I have seen the bridge, at the back of the Courthouse here, impossible for foot passengers, except they choose to take off their clothes. I have seen the people obliged to travel in carts or other vehicles. On the other side of the bridge, which divides the King's and Queen's County, the same thing occurred, and vehicles or boats have to be employed during high floods. As a matter of opinion, I may say that, except that Portwillington happens to be built in a sandy basin, it would be unworkable from fever. Had it been built on a sandy basin, I am certain it would be uninhabitable in its present state. I am agent for Evans and McNeill, miners, estate, which is in both the King's and Queen's counties. Today I intend only to call your attention to portions which is in the King's County—Clonsilla and Trauseen.

1049. We will take Clonsilla first—what about it?—There is nothing to say about it.

1050. You don't object to the areas which are marked down as flooded and injured?—No, I have looked at the maps, and as I can see from the maps the areas are correct.

1051. What about the present actual value?—I have no means of knowing that exactly—I could not

well separate the holdings. I beg, however, to say that the estate is in rather a transitional state at present. The great body of the rents have been revised by the valuator appointed by the Court, and with very few exceptions the tenants have accepted those revisions, but the Court has not yet approved of them. After the revisions have been approved of, the tenants will be bound for the statutory term under the Land Act.

1052. Have you seen the valuation put down by the valuator here?—No. I would suggest it would be desirable if there were any means in your power, to let me know, so that I might communicate with the Court, how the rate for improvement will be allocated, and what will be the proportions for owner and occupier—whether the proprietor will have to bear any.

1053. We have nothing to do with the apportioning of the rate. We are merely investigating the subject, and eliciting information with regard to it. We shall be happy to receive any information you can give us—I have communicated with the Court, and informed them that the meeting would be held here to-day, and that similar meetings would be held in other places mentioned, but I have received no instructions on the matter. I have no doubt that the parties who will have a beneficial interest in the improvement will be looked upon as the parties who have to pay the rate.

1054. That is not a point we can enter upon. Explain to us what you want to put forward?—I would only ask that the Court being about to enter into an agreement with the tenants, at reduced and revised rents for the statutory period of fifteen years, I might be able to inform the Court in what way the interests of the estate have been treated by the Commission.

1055. We have no power of treating with the estate. We are merely an inquiry Commission, but we can make recommendations. If you state to us your view as agent for the estate, of what would be most advisable, we can put that forward as your testimony?—Well, I would only repeat the observation that I think the party who has the beneficial interest, whether it be the occupier or the landlord, should be the party who should pay the rate.

1056. Personally, as far as your knowledge goes, you don't object to the valuation which has been put on those lands?—I have no means of knowing the valuation, because the whole of the townlands are not given in those areas.

1057. You have seen the map?—I have. As to

the coloured part on the map, I believe they are correct.

1078. It is rather a large amount. If you could give us any information, or your view on the subject, of course it would be of use to us. You had an opportunity of seeing the valuation book?—Yes.

1079. Sir JOHN McKENNA.—The schedule gives the valuation in grass, the book gives the valuation divided into lots. It is therefore easy to see what the proposed assessment is, in the event of the works being carried out, on the different lots?—I have seen that, the probable increase.

1080. In Clondelock and Tinscan, it will range from 3s to 12s. 6d. the statute acre, but there is only a small quantity at the highest charge, about twelve acres?—There is a large quantity of bog in connection with these lands, and, as a matter of fact, it is not separated here.

1081. Lord CAHILL.—Do you assert that the bog comes within the area mentioned?—I cannot tell that.

1082. Does your observation apply to Clondelock and Tinscan?—Yes, to both.

1083. They are not marked here as bog. How much do you say is the bog area?—I cannot say. It is not so much about that I wish to speak, as with regard to the injury caused by the floods. I have known these lands for many years, since 1878, and, speaking generally of the whole estate, since that time the losses on the estate have been enormous. The injury done to the crops alone has been so great that we have had to make enormous abatement.

1084. Have the floods ceased at all?—They have not been so bad since 1883.

1085. Give an idea roughly of the injury done. Were the abatements given solely on account of the injury done?—Solely on account of the injury done. We had to take several things into consideration, first and foremost the elements. The rainfall increased tremendously, for instance, the maximum average rainfall in the King's County is twenty-eight inches; well, in 1883 it was thirty-six inches.

1086. That was a temporary effect, but what was the effect of the flooding?—The summer floods first rendered the sowing of the crops very precarious. The highest flood I ever remember occurred on the 25th August, 1883, I happened to be out on the townland of Inchacooly two or three days before the flood. There I saw on what used to be a magnificent piece of pasture land, cocks of hay, many of them made up and saved, and the rest in different stages of manufacture. Then, two days after, all the crop and labour and everything was lost and ruined. Not only was the hay taken away, but my prospect of future grass was destroyed. And I have known evil effects on the cattle which have used the pasture after these floods. When the floods go away, the cattle that use the pasture take disease and pine away. I am speaking more particularly of the period from 1878 to 1883—these were especially wet seasons and of course, told more on the land. In connection with those remarks, I would wish to say that the effect of the floods has been to my knowledge materially increased owing to the water having been thrown down very much more rapidly from the Rathangan and Kildare drainage districts. What is called the Black river, which falls into the Barrow, runs round these lands that I have spoken of. In former years, say twenty or twenty-five years ago, the people holding callow lands were able to prepare for the floods—when the rain commenced, they knew that the floods would come down in a certain time, and they, to some extent, prepared for them. But that is not the case now—they have no time to prepare—the floods come down at once.

1087. Is the whole of Tinscan subject to floods?—Some of it. Most of the land of Tinscan, which is in the King's County, is injured. The amount of land put down as injured, in Tinscan, is 278 acres, and as flooded 163 acres. Well, that land is more on the river margin. The injured lands extend a con-

siderable distance from the river—they lie between the bog and the river.

1088. Is that 163 acres on land?—The flooded portion is meadow, along the river banks; and the 278 acres, the injured portion, is more pasture.

1089. Have you noticed that the improved value put upon that land is very high?—Yes.

1090. In your opinion would it be realized?—In a great many places it would. I have always held, although it was disputed by some, that the best land on the estate would benefit most. I went over the flooded Inchacooly lands with two Land Commissioners, and we got in some places twenty inches of beautiful soil, and in other places there were only ten inches.

1091. Have you any means of giving us information as to the valuation put upon the land by the Land Commissioners?—I can get it for you.

1092. Mr. SEYMOUR.—How much per acre was the abatement which you allowed in consequence of the floods destroying the crops?—The basis upon which the abatements were calculated by direction of the Court was an approximate one, made in comparison with the poor law valuation and the rent.

1093. But the abatement was not made in consequence of the floods taking away the crops, or injuring the crops?—The first abatement was. Then afterwards there was a more permanent abatement given, and that was made upon a comparison between the rent and the poor rates. If a man's rent was so much above the rating, he got more than a man whose rent was only a shade over it; and the man who was under the poor law valuation got none, but there were very few cases of that description.

1094. But what was the total of the abatements in consequence of the lands being flooded—how much do you think they would come to in money numbered?—They would be on an average of about 20 to 28 per cent. on the different parts of the estate.

1095. How much on the whole of the estate?—I could not tell that.

1096. I want to see would it amount to as much as the improved value set down here?—Well, I can have that for you at the Monasterevin meeting on the 21st.

1097. Lord CAHILL.—The Commission would be prepared to hear you now as regards the portion of this property which is in the Queen's County if you would think it to go on with it?—I would prefer going to Monasterevin when I will be better prepared.

1098. Colonel CAMBER.—You spoke about abatements having been made—were those abatements made in consequence of the flooding of the lands or on account of the abatements being made by everyone?—It was not on account of the flooding alone—it was the flooding, the great depreciation of prices, the effect of climatic influences, &c. There are some tenants on the uplands who were not flooded at all and who got abatements. But those who got the greatest abatements were those who had flooded lands.

1099. What I wish to find out is, whether those abatements were made solely on account of the flooding?—No, not solely on account of the flooding. I am quite sure that if the crops had not suffered, and that these floods had not occurred on the Barrow, the tenants would have got abatements. I remember sowing a meadow for a gentleman, now deceased, at £4 16s. an acre, and I had to cut the same meadow for 18s. an acre afterwards.

1100. Sir JOHN McKENNA.—That was for the crops?—Yes, for the crops.

1101. There is a very large portion of this land only injured—not flooded?—Yes.

1102. Do you think that 3s. an acre for the improvement which might be effected by the works too much, that is 3s. the statute acre?—Well, I would not think it too much, because these lands are very wet and very cold, and there is no fall.

1103. It is contemplated that the works if carried out would give a power of thorough drainage

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to the depth of four feet, do you think the land would be improved to the extent of 3s. an acre if that could be done?—Oh, certainly. I think the giving of an out-fall to the injured lands would be intrinsically value for 3s. an acre.

1104. Take the townland of Clondelash, there are seven acres of that put down at 4s. 6d. improved value, then there are 12 acres put down at 12s. 6d. I presume it is the rich lands that you have been referring to?—There is not so much rich land in Clondelash.

1105. Then there are thirty acres in the same townland put down at 6s. an acre improvement—do you think these are fair averages?—I could not well say. I should say that you are referring to those lands which border the river.

1106. Yes, supposing they were thoroughly drained, would they be worth 4s. 6d. an acre more?—I am sure they would for there must be deep land there.

1107. I see lot 5, twelve and a half acres—do you recognize that on the map?—Yes.

1108. Would 12s. 6d. an acre put down as the charge for "improved value" of that land be too much—that must be very good land?—Well, no; I could not say that, for each of those lands is getting lower as you come down to the river.

1109. \* Lot 4, thirty-eight acres, probable increased value 6s. an acre?—would 4s. be a fair charge there?—I think so.

1110. Then take the other townland, Treonan, you need not mind the injured lands, they are the same as in the previous instance, 3s. an acre; but there is lot 5, flooded land, 4s. an acre improvement—what do you say to that?—I think the increased value would be that much.

1111. Lot 6, the increased value is 4s. an acre for forty seven acres—of course the estimate is grounded on the assumption that the risk and loss to which you have been referring, will be altogether avoided in case the drainage is carried out?—Those parts we are dealing with now are pasture lands, and if they were improved in the way you say they would be worth 6s. an acre more—that is if they were rendered capable of being tilled and worked.

1112. The last lot is marked number 7, it appears to be of the highest quality and the probable increased value put down is at the rate of about 12s. 6d. an acre?—At present the great bulk of the lands marked blue are lands which could not be tilled in their present state.

1113. But you must assume that the lands will be entirely freed from floods, and that ample capital will be given for the drainage?—Then the question simply resolves itself into this—will the party who is in a position to avail himself of the advantage, do so; otherwise the imposition of 10s. or 12s. an acre would be a dead loss to him. Of course if you lower the water table of the district you must improve the land around you, but one man might avail himself of the full benefit and improve his land by thorough drainage, and make

it a great deal more than 10s. an acre better to him, but another man might not wish to do that at all and the charge would be a burden on him.

1114. Mr. BAILEY.—You are well acquainted with this town?—Yes I am; I lived here for the last seventeen years until the last four years.

1115. And do you concur as to the necessity of lowering the Barrow in order to make the sewers work and have an effective system of sewerage?—Most certainly. I know that the Board of Guardians at Mountliff got the town surveyed and mapped for the purpose of having a proper system of sewerage carried out, but it was not completed or carried at all, and the reason was, I suppose, because they could not get a fall. There is a portion of the town in the King's County, a quarter of a mile from this, and that is the only point of the whole town where they could get a fall for the sewers.

1116. Mention was made of two sewers in the town, one is the old one, and one a new one?—The river Barrow goes partly round the town, and what is called the old sewer was a small stream that went across the town at the head of the river, into the Barrow. It passes under the main street. It is dried up, and is used as a main sewer for surface water, but it is not a sewer at all—it is in a hollow in the middle of the main street—it has no fall into the river, and it is choked up when it is supposed to fall into the river. There are two cross sewers used by parties for their own convenience, but the sewage is carried away from the sewer by an open ditch to the river, the fall being very little.

1117. In your experience have the floods been more injurious to the health of the town of late years than formerly?—Certainly, the floods were a great deal more frequent for the five years previous to 1864, and were, if possible, larger in volume. The reason of that, I assume, is, in the first place, that the waters could not get off; and the next, that the obstructions in the river are greater.

1118. I think, in the first part of your evidence you mentioned something about the number of inches of rainfall?—Yes, I had the means of knowing what it was from the County Surveyor's office, in the King's county. The maximum rainfall in the King's county was twenty-eight inches, but in December, 1883, the maximum was thirty-six inches. A gentleman who is in court, Dr. Haxton, keeps a rain gauge, and he can give you very valuable evidence on the subject, if you so desire.

1119. When you say the rainfall was thirty-six inches in December, 1883, you mean that thirty-six inches was the fall for the twelve months ending December, 1883?—Yes; thirty-six inches of rainfall for the twelve months, ending December, 1883.

1120. And we may take this to be a fair indication of the rainfall in this part of the Barrow district?—I think so.

Michael W. Haxton, M.D., continued.

1121. Lord CASTLETOWN.—Would you give us some information about the state of this town?—I have kept a daily register of the weather in this town for forty years, and of course, in connection with it, I have observed certain things relating to the river, and to the state of the district in general. These returns are published monthly in a semi-Government department which is conducted principally by Mr. SIMONS, of London. These published monthly returns contain information regarding 400 or 500 stations in England, Ireland, and Scotland, and if you look at them, at the places where I have marked, you will see that I have supplied returns for Portlaoighis.—(Handed in returns).

1122. From your great knowledge of the district would you kindly state your opinion as to the state of the district?—I could not conceive any district which could be worse off, in respect of flooding. I may

mention a case—a very extreme case—relating to the effect of the flood which occurred two or three years ago. A man was lying ill with fever in his house near the river, close to the bridge. He had become so weak that he could not be removed, and I was asked to go with the medical officer to see him. He died two or three days afterwards, but when we called to see him there was a foot of water under the bed on which he died, and the whole of the house was completely flooded.

1123. Was it flooded continuously during the winter?—That was in spring, and for several years that has been generally every year, and every year getting worse.

1124. Every year growing worse?—Every year growing worse. The house which you can see from this window is flooded fully half way up and the people are obliged to leave the houses.

Michael W.  
 Haxton, M.D.

July 17, 1881.  
Michael W.  
Harden, M.P.

1135. Have you any knowledge with regard to epidemic?—It is generally here. I think the floods conduct very much to disease here. At the present moment we have scarlatina in the town, and we have a good deal of fever from time to time.

1136. Is there much fever here now?—This is not the time generally that we have the fever—it is in the autumn.

1137. Is the town ever free from scarlatina or fever cases of this sort, or is it only occasionally?—Oh, it is only occasionally. There are very few places where it is constant. Perhaps the most constant place we have in this country is about Dublin.

1138. Do you find it comes in when the floods come again?—You know the flood last for such a length of time that it soaks into the land about, for a great distance on each side.

1139. And this produces those fevers?—Yes, and it is not only human beings who suffer, but cattle suffer also. This spring we have had a great loss among cows in this district, particularly cows in calf and in fact a depreciated stock. They are not equal to what they would be if we were free from floods.

1140. Sir JOHN McKEILL.—Does the injurious influence of the floods extend beyond the actual flooded lands?—It does, a good way inland.

1141. Would you say to any great extent?—I would say two or three miles at least; and of course the air carries off the damp of the flooded lands.

1142. And that is of a malarious nature, I suppose?—It is more or less of a malarious nature.

1143. And that, of course, affects the health of the district, not only of the flooded lands, but beyond them?—It does.

1144. I suppose it produces fever and rheumatism?—Yes, fever, rheumatism, scarlatina, and chest affections to a very great extent—coughs, asthma, and inflammation of the lungs. I have been keeping a register now for forty-three years, and I think there is more disease since the river became so very bad than there was at first when I began. I began in the year 1843 to keep a register, and then, of course, we had disease; but within the last fifteen or twenty years disease has greatly increased in the district.

1145. And to what do you attribute that increase?—To the flooding.

1146. And to what do you attribute the greater obstruction of the river?—Entirely to the sand from the mountains, brought down from the sandhills at Glasalee. Every flood and wind breaks up the sand.

1147. One would have thought that it having accumulated there for years there would be no reason why it should come down in large quantities recently?—Yes; it has been accumulating there for years, but it is coming down gradually. We have records of eighty years ago showing that heavy barges came up the river to this town, and I suppose a skiff could not come up now. I think a great deal of this is due to the water between this and Monasterevan, and at Monasterevan, and below Monasterevan, towards Athy, there are obstructions which will not permit the water to flow.

1148. But these always existed—these obstructions?—They did, but it is the gradual accumulation that causes the increase. We put what are called flags, for chengams, along the streets here, which are nothing but grains of sand with some solid cement, and when they get a little ruin or wet they crumble away immediately. Formerly we used always limestone flags, and they were very durable, and some of the old inhabitants are able to recognise some of them as having been in the streets fifty years.

1149. Do you think the sanitary state of the district affects the poor rate at all?—It does, because it produces a number of orphans, and we must provide for them in the poorhouse.

1150. And I suppose it produces a number of sick persons also?—Of course. I was for some years a guardian of the poor in Mountmellick, and know that to be a fact.

1151. Mr. HARVEY.—Could you give to the Commission the annual rain fall for the last twenty years?—Certainly.

1152. The number of inches and decimals of rain that have fallen for this year or the last twenty years?—I can give you that. I have only to refer to my book. I have the returns by the month. I will post the information you require to the Secretary.

Mr. W. R. Cobb, of Portlinton, examined.

1145. Lord CAMMERGROSS.—Do you wish to give us some information?—I do, about the sanitary condition of the district, in which I am more interested than anything else. There could be nothing worse in any part of the country than I have seen here in the streets and houses. I have visited from house to house in bad times, and have seen fires in basement stories completely put out, and the inhabitants driven to the upper stories by the floods. I have known the floods to stay for a fortnight. This condition of things I have seen at Bucklebury and Barrow-in-Wad and Spa-Lane, Queen's County; in the King's County, adjoining the police barrack. The sanitary authority made a sewer to take some of the water off, but the back water of the Barrow sends it back again. A man to-day assured me that he had to take his wife and family out of the house in a boat until he was able to get them into a green field some distance off. When the back water of the Barrow comes into these lands it remains there, and becomes stagnant, and pollutes the drinking water of the pumps around, so that in the town in the King's County around there the water is very unfit for human use. I have driven over the district myself, and have experienced the bad effects of the cold air which comes from off the water of the flooded lands. It affects the throat and chest. I have felt its effects myself in my own throat and chest, so it must be injurious to the community at large. I fear for one would not be in favour of conferring the chargeability for improvements upon the actual area benefited, because, in a commercial point of view, if you relieve one part of the country

the whole surrounding district will be benefited. I will give you an instance of what I mean. If a man coming into the town of Portlinton to market or on commercial business catches scurvy, he may carry the miasma through the length and breadth of the land. Therefore, it would be the interest and benefit of the people in the surrounding district who come into the town to have the town in a good sanitary condition. I have, as an auctioneer, set a great many of the Pullough meadows between this and Brackna. Well, in the years when we have good weather we could get a fair price for them, but in other years we get little or nothing. In 1881 I set 100 acres at from 8s. to 16s. an acre. In 1883 I got from 6s. to 14s., but the crops could never be got off, for the flood came. You would pity the poor people; some of them went into the field and drew the crop out of the water, and I never got any payment, except from those or few. Last year there was an improvement. The weather was better, and I got up to £1 an acre. I set some land on Tuesday last, and I got from £1 to £2 an acre for the same land that in last year I could only get from 8s. to 10s. an acre for, merely because it was a dry season.

1146. Lord CAMMERGROSS.—Are those meadows on the banks of the Barrow?—Near the Barrow—within two and a half miles of Monasterevan, at the back of Inchacooly. This is a part that if the lands were drained they would be worth a great deal to the country. My calculation was that it would cost about £9 an acre, and if that was spread over thirty years it would be only something about six shillings an acre. All governments should care for the health of their

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subjects, and the English Government of to-day more than any other in the world. It ought to be actuated by the greatest humanity, and therefore I think that the Government ought to give a public grant, so that the ratepayers of the country around would be indirectly taxed, and not merely the immediate locality. If the Government does not give a grant of two-thirds, or at least a half, I certainly would not recommend the people to pay or to agree to go into the matter at all, because it would never pay in a pecuniary point of view.

1143. Do you hold any land yourself?—Not immediately here. I live within three miles of this.

1144. But would you be subject to the rate?—I think the area should extend further than my place. I think it should extend to a very large extent through the county, because I have heard the doctors swear that benefits may be derived from the removal of a nuisance five miles away.

1145. Does any land of yours come within the proposed area?—I come within three miles.

1146. But you are not affected—you are not mentioned in the schedule?—I did not see any of those schedules. I got none of them. I have the minutes of the Sanitary Board here, showing what was done. I have Dr. Barke's opinion, Dr. Taketown's opinion, and the resolutions of the Guardians, showing that we could do nothing until the Barrow is drained. (Hands in documents.) There is also a sewer in the town commonly known as the old canal. It is almost intolerable to walk near it. It has no outlet, because it is stopped at the mouth by the river sand, and once the sand gets in there it stays. I hope the Commissioners will recommend the Government to give a very substantial grant in order to allow this great drainage to be carried out, a drainage which has been made the subject of Government reports for fifty years. As to the cost on the locality, anything more than three shillings an acre, in my opinion, would not do. I totally disagree with some of the landlords who have spoken with regard to the chargeability of payment in this matter. If the Government pay at least a half—and I would not recommend the drainage to go on unless it got a grant of a half, so they get in the Skuasman, Beck, and other places—then I think the other half should be divided between the landlord and the tenant, because the landlord would have a great interest in having a tenant able to pay his rent. I would see no use in a landlord having a great rental if he has to eject the people or give his tenants abatements, as Mr. Jennings told us to day.

1147. Lord Castlemore.—Do you think the people of the district—and you know the district—would have any objection to pay a rate in aid?—I mean those who are directly affected by the drainage—people living in houses in the town?—I have been speaking to them on the subject in various parts of the town, and I never heard one of them object; but they consider that by the improvements their health will be benefited. They would not object to a fair payment. Another witness to-day referred to the trifles. I consider that all the trifles should be made to contribute.

1148. But they are all included?—Yes, but I want to show that greater cost would have to be incurred to sink the bed of the river for the benefit of the contributors.

1149. Sir JOHN McKEOWN.—You mentioned that through travelling through the country you had experienced the discomfort of a sore throat from the cold, wet atmosphere you passed through?—Yes.

1150. How far above the actual flooded lands did you experience these attacks?—I felt the attack the minute I caught the breeze coming over the flooded lands, a mile away.

1151. Would that be in the early part of the day or in all hours?—In the morning and evening.

1152. And was the air charged with moisture in

the shape of mist or fog?—It would be worse in heavy weather than on a breezy day.

1153. But supposing it was not a breezy day, would there be a mist over the land?—Yes.

1154. And how far beyond the flooded lands would you find that?—Oh, I felt it for a mile.

1155. Then there would be a vast extent of country injuriously affected by the floods though not actually flooded?—Certainly, and a person with a cold throat would feel it more than any one else.

1156. You think you could not feel the effects of the damp air for more than a mile away?—Well, at the distance of a mile was the furthest that I took any notice of it.

1157. Have you any knowledge of agriculture at all?—Yes.

1158. Is in your opinion that the wet fog would affect the agricultural condition of the country with in the scope that we are speaking of?—There is no doubt of it, because the damp weather especially in harvest, is more likely to do injury to crops.

1159. Would it retard their ripening?—Yes.

1160. And would render them subject to blight, perhaps?—That is my experience.

1161. But you could not define the limit of the extent to which that would go—the range?—I never paid particular attention to the question, but I know the crops would be injured where damp atmosphere or moisture permeates.

1162. Mr. BARNES.—You mentioned 3s. an acre as the amount for that locality to be paid in regard to the improvement of the injured lands—do you mean that to apply to the statute acre or the Irish acre?—Oh, the Irish acre.

1163. And do you mean that that is the maximum that might be put on any one acre?—There are 31,000 acres and 29,000 acres of bog affected by the drainage, of course I would put on a heavier charge on the upland—tillage land, than I would upon bog land or moors.

1164. Then 3s. an acre would be the average?—The average.

1165. Have you considered how much the land that would be most benefited—the best land—could afford to pay?—There are some lands that will be benefited to the extent of 6s. and 7s. an acre, where there are cold soils which you will have an opportunity of draining hereafter, that cold sub-soil is land which unless it is drained won't produce well, and you want to make it warm, so that I think it would be made worth 6s. or 7s. an acre more when drained.

1166. Colonel CANNON.—Do you think the people living at a distance of from three to four miles from these flooded lands would consent to pay a portion of the charge of 6s. or 6s. an acre?—I would not put so much on them; but whether they consented or not I think some tax should be put on them for the public good. These Acts of Parliament are passed for the public good, and where anything is for the public good, whether we like it or not, I think we should pay our proportion. But of course I would not say that persons living at a distance should pay as much as a person who is more benefited and living close to the locality of the improvements. But it would come lighter on the locality, the more you spread the area.

1167. Lord CASTLEMORE.—Your idea is to increase the area of charge as much as possible so as to minimize the cost all round?—Quite so.

1168. You would have a scale of areas?—Yes, a scale of areas; that is what I would consider most fair.

Lord CASTLEMORE.—I would like to mention, for the information of any who may object to particular given in the schedule, that Mr. Fitzgerald was not able to be here today to answer any objections as to his valuations or mappings, but he will visit the lands and examine into all these objections, and he will give the objectionable intimation of his intended visits.

Mr. Patrick White examined.

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Mr. Patrick White.

1171. Lord CARLETON.—Who are you?—I am the proprietor of a farm of 130 acres, on the banks of the river Barrow, in the King's county, barony of Trillick; but my holding is not mentioned in the schedule.

1172. Is it flooded land?—It is not flooded, but it is injured by the floods. I have about four or five acres of flooded land.

1173. And you are sure it is not marked on the map?—I am. I fully agree with what Mr. Cobbe has said—that unless the Government gives a very large amount, say two-thirds, or at least half of the grant for these improvements, it would be a useless thing to drain the Barrow, and try to put eight shillings or nine shillings an acre on the lands.

1174. What would you say would be enough to pay for your land?—Well, about three shillings an acre, what Mr. Cobbe said. There is very little of my land flooded—it is injured and certainly it would be greatly relieved by the carrying out of Mr. Manning's scheme. But supposing the Government failed to contribute largely, it could be fairly relieved without carrying out that scheme—by removing sandbanks and bushes and islands in the river.

1175. Have you any experience of the formation of these islands?—I have. For the last ten years the river has closed up more than it did for 100 years previously. About sixteen years ago I remember there being eight feet of water where there is now an island. If the river continues to close up for the next eight or ten years, as it has during the last eight or ten, there will be no river at all, and it would be absolutely impossible to live in the place. I have also seen in Spa-street, in the town of Portlinton, two feet, three and a half feet, and four feet of water.

1176. I find your land is mentioned here, in the book, No. 6, what kind of land is that?—Cutaway bog.

1177. Would it be fair to put an improvement value of six shillings per statute acre on that land?—No, for the land itself would not be worth six shillings an acre—it is old bottom pasture.

1178. Well, as regards the few acres which you say are flooded, what do you think the improvement to them would be worth?—I think thorough drainage would not be any addition to their value, for they would not be fit for tillage.

1179. What is the most, do you think, the improvement would make them worth?—If the floods were taken away altogether, I think they would be worth thirty shillings an acre; but that is a very small portion of the lands—it is only a stripe on the banks of the Barrow; I am not counting in that the bog pasture.

1180. What would the bog pasture be worth if clearly drained?—About seven or eight shillings an acre, if clearly drained.

1181. Mr. BARON.—Is not the land the worse of being wet?—It is. The soil is naturally good, but what I suggest is that if the Government does not give a large grant towards this drainage, the best way to get about relieving the lands, would be to remove the sand beds and bushes and small islands and take out the sharpes. That would be done for a trifling amount, and be the best way to deal with it. The land I pointed out to you on the map would be better for grazing purposes, but it would not be worth anything for tillage. However, I may say that it would be impossible to live in the town of Portlinton unless something is done.

Lord CARLETON.—Let your neighbours know that if any of them have any objections to offer as to the proposed increased valuations put upon their holdings by the valuator, or as to the assess, the valuator will go down to their places and see into the objections.

The Commission then adjourned to Tuesday, the 21st July, at Monasteraven.

## TUESDAY, JULY 21st, 1885.

July 21, 1885.

The Commission met in the Courthouse, Monasteraven.

Present:—Right Hon. HENRY BRUCE, Vice-Chairman, presiding; Sir JOHN McKEELIE, Colonel CARDEN, Mr. HASSARD, C.R., and J. A. GARRETT.

Mr. PENNY, Secretary, was also in attendance.

Mr. BRUCE.—The Barrow Drainage Commission is now ready to hear any evidence which may be offered to it with regard to the scheme and area, the schedule of which has been forwarded to all the proprietors.

Dr. Joseph Tebbins, examined.

Dr. Joseph Tebbins.

1182. Mr. BRUCE.—Will you kindly give your evidence in the form of a statement, and then the members of the Commission can put any questions to you?—I regret that I was not able to be present at the meeting in Portlinton, but I was summoned by the Archbishop, previous to getting notice of your sitting there, to attend a diocesan convocation on the same day and hour. Now, I suppose it is with regard to the sanitary condition of the town of Portlinton that you principally wish me to give evidence. It has been under my charge for over fifteen years, and it is damaged and injured to a wonderful extent by the continual flooding of the Barrow. As regards the health of the town, I may state that I have seen from thirty to forty houses, or perhaps more, flooded continually by the Barrow, and flooded to the extent of having three or four or five inches of water in the houses. I have attended people in some of these houses, lying as it were in the middle of the water, with water from three to four inches in depth up the

posts of the bed, and I myself standing on a chair. I have frequently attended people under such circumstances. The floors of the houses are composed of clayey mortar and sand. The flood lasts generally for two or three days, and when it goes down it leaves the floors in a terrible state. Damp, bad vapours exhale from the floors, and all kinds of mischief are done in that way. The result is, that under such circumstances the people who are all poor, we find great difficulty in getting them well again. There have been epidemics in the town—scarlatina principally, and fever. There was a considerable outbreak of typhoid fever in it some years ago. There were some fifty cases in the town alone. It was fever of the most dangerous character and most virulent type. I would not altogether say that the fever at that particular time was entirely caused by the flooding of the river, but I have reason to believe—very strong reason—that an immensity of damage is done to the walls of Portlinton, that is to the pump wells of the town,

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from the flooding of the Barrow, which flushes back bad water through the sewers into the wells. There has been a good deal of scurletina in the place. Of course you must look at bad drinking water as one of the most dangerous things that could possibly be assigned for any human being to partake of; in fact any disease or epidemic may break out, and particularly typhoid fever, from drinking bad water.

1183. Have you observed any difference in the water in the summer and winter?—No, I could not say that I have, but it is generally in summer when the sewers would be a little flooded, and then the water is flushed back again, and I had those outbreaks of fever. I seldom had any fever in the winter. There is scurletina at present, I believe, in Portarlinton. I am not attending the cases at present, but I believe there are four or two. I am not the medical attendant of the Constabulary, but I have heard there is one in one of the police barracks.

1184. Is that police barracks in that part of the town that you say is liable to be flooded by the rise of the Barrow?—It is. There are two police barracks—one in the King's County and the other in the Queen's County. It is in the King's County one the scurletina is, and as to the Queen's County barracks, I understand from the Constabulary that the kitchen floor is covered with water. Even some of the houses occupied by the gentry of the town have water on the floors. I have seen as much as four inches of water in some of the kitchens.

1185. Have you observed of late years any increase in the floods?—Yes; I think there has been a considerable increase, and I think that is due to the drifts of sand which have come down. It is very hard now for the water to get away. I know the river Barrow from Mountmellick to Lee, or the corner of it. I have been there from time to time, and know it intimately. There is an immense deposit of sand at present in Portarlinton—in fact, I think there is from a quarter to half an acre of sand now lying at the bridge, where I remember a few years ago there were only a few cart loads. Consequently, there is a regular dam formed there, and the result is the water can't get away when the flood comes. It has been full through the sand deposit.

1186. Do you suppose that the sand comes down more by the Barrow or by the river that comes in there—the Ouseman?—It comes principally from the Barrow. I am quite satisfied about that. The course of the river, too, has been considerably changed, owing to the sand accumulating in it, and pushing it away in a different direction.

1187. You are the sanitary officer of Portarlinton?—Yes.

1188. And I suppose in that respect you have had occasion to look to the sewerage of the town?—I have. I had a good deal to do with it, and it is in a very bad state in some places. There is no main sewer in Portarlinton at all, with the exception of one which is hardly worthy of the name. It is called the Old Canal, but it is choked up, and is in a horrid state. At the present moment it is choked up from the town to the entrance to the river Barrow.

1189. Is it possible to effect a proper system of sewerage in the town unless the river is lowered?—It is not. I don't believe it would be possible to do so, because no matter how often the sewers are cleared out in time they will fill up again. That I have seen in this particular sewer I refer to.

1190. Do you observe of late years more flooding in the summer than there used to be?—No; I don't think so. I did not particularly observe that; but I did remark the floods are very much greater and very much longer in duration—that is, before they get away—than they used to be.

1191. And I suppose that is attributable principally, if not entirely, to the choking up of the river?—I believe so.

1192. And I suppose it is partly due to the increase of the rainfall of late years?—Yes; there is an immense obstruction between Portarlinton and Moone. Whenever the trees fall they all lie right across the river. They collect all the little branches and everything that comes down, and in a short time they form a complete dam.

1193. Has anything been done in the locality by the proprietors, or the farmers, or the shopkeepers to clear away these obstructions?—No. There is an immense deal of obstruction in Carrigish damene; it is one of the worst places I know of as regards obstruction.

1194. Sir JOHN McKENZIE.—Do you regard the town as more unhealthy than country towns generally are?—Oh, no; I look upon it rather as a healthy town. I have been connected with it all my life professionally. It is a wonderfully healthy place. I say that after my fifteen years' professional experience of it, but at the same time it is subject to these epidemics.

1195. Are these periodical?—Well, we have always more or less fever. We have not had such an outbreak of fever as that alluded to for four or five years. That was genuine typhoid fever.

1196. You are well acquainted with the district at large?—Very intimately. My district takes in about eight square miles.

1197. Do you look upon the floods to which the district is subject as dangerous to the health of that district?—Most so.

1198. Do you think that the injury extends beyond the actual area of the flooded lands?—No, I would not say that. It is more confined to the town and to the neighbourhood of the town. I would say within one mile or so all round the town.

1199. Don't the floods render the atmosphere wet, damp, and cold?—Oh, yes; very bad.

1200. And doesn't that damp atmosphere extend beyond the flooded lands to some distance?—Within a mile or so round the town.

1201. But reckoning the district as a whole?—Oh, no; I don't think it affects that.

1202. I believe it is a very flat district?—It is very flat.

1203. And don't you think it is injurious to the health of the district when these damp fogs spread over these wet flooded lands?—Oh, they do, but I have not found that they injure any general district except within a mile of the town. There is no flooding except within three miles of the town, and the floods don't affect at all another place where I have got another dispensary—Cloneyglass, Korryglass.

1204. Colonel GARDNER.—You say the health of the town as a rule is good?—Very good.

1205. Do you attribute that to the sandy soil?—Not entirely.

1206. Do you attribute that to the sandy soil?—Well, I attribute it to that, but on one side there is a limestone country, that is away towards Mount Henry, and on the other side we have the bog, which I believe is most wholesome.

1207. But it is a sandy soil?—In parts, and consequently the water and bad matter will penetrate it a great deal easier than any other soil. I look upon that point about the wells as most important.

1208. Mr. BURKE.—You believe the water and bad matter will eventually permeate the wells?—I think it is carried back into some of the wells at the present moment.

1209. You have no pipe water in the town?—No, it is all drawn up by wooden pumps.

1210. I have before me here a copy of Report from you to the Guardians of Mountmellick Union, dated 2nd February, 1885. Do you remember that report?—No, I could not bring it back to my mind unless I had my blank book here.

1211. I will read it over to you, and ask you whether you confirm it? In this report you state:—

"As Medical Officer of Health I beg to report to you the basis in the town (occupied by the following parties), which have been rendered unfit for human habitation owing to the recent flooding of the River Barrow. Previously, and at various times, I have seen many floods caused by the sand rising out from below to such an extent. Some of the people had to abandon their houses, and some who remained the water reached to within a few inches of the bed upon which they lay. I greatly fear the consequences of the state of things as regards the health of the immediate occupants of these houses, as well as the people in general of this town. In all probability such will be followed by sickness of some kind, possibly an outbreak of fever, rheumatism, and other affections. I am of opinion this would be all remedied if the Barrow drainage is carried out."

And then follow the names of the respective parties who occupied the houses—forty-four names!—I recollect that Report very well; it is quite true.

1212. Has anything occurred since to cause you to change your opinion?—Nothing.

1213. I think you said you suspected some of the wells of being polluted?—I believe they are.

1214. Has any analysis been made of the water of the town?—No. Some years ago Dr. Wall, who had a large school in the town, sent up water from some of the pumps in his place to Dr. Cameron for analysis, and Sir Charles Cameron sent him back word that he had analyzed the specimens sent. He stated that he found one fairly good; another was very bad; and the third, I think he said, was not fit for use at all.

1215. Is not there a public analyst paid by the Grand Jury?—Yes, I think Sir Charles Cameron is.

1216. Might I ask you then why the water in these suspected wells has not been analyzed?—I could not really answer that question. I believe the best water in the town is to be found in the public pumps; and the water suspected of being bad is in the private pumps.

1217. But under the Public Health Act cannot the private pumps be analysed? I think they can?—I dare say they can.

1218. Colonel CAMERON.—Were any of these wells you speak of analyzed by Dr. Cameron, by direction of the Board of Guardians, do you recollect?—I don't recollect. Dr. Wall sent the water from his pumps up privately. I dare say many people are not aware that they could send samples of water from their private wells to the public analyst for analysis. I was not certain of it till now, from what the Chairman said.

1219. Mr. BURNES.—I am only stating my belief?—I dare say it is quite right. I can easily find out.

1220. As the public analyst is paid by the Grand Jury, does there appear to be any reason why advantage should not be taken of his skill to ascertain the quality of this water?—Certainly; I shall see about it.

1221. Sir JOHN McKEILL.—Do you think that the inhabitants of the town would be disposed to subject themselves to a fair charge for the improvement of the sanitary condition of the town?—I believe they would be very happy to see it drained, to prevent their houses being flooded. I have seen those who live in two-story houses frequently obliged to quit the lower floor, and keep in the rooms upstairs, where they were obliged to remain in a very crowded state, which in itself is very bad.

1222. In your report of February, 1883, you add the names of forty-four persons who had to leave their houses?—Yes; I would know some of the names again if I heard them. These houses change owners pretty often. They are a sort of lodging houses—the occupiers are here to-day and gone next week.

1223. Colonel CAMERON.—Is there anything else you wish to mention to the Commission?—Yes. My name appears in the schedule in reference to some land. They have returned me as having land flooded and injured to the extent of 379 acres. I know all my property very well, and I cannot exactly say that that

amount of land is at all injured. They return me as having land flooded to the extent of 197 acres 3 roods, and land injured 182 acres 1 rood, making in all 379 acres 3 roods. I must say that I am not at all aware of having 197 acres flooded, and I don't see how they can make out that acreage.

1224. Mr. BURNES.—Then what do you say with regard to the number injured?—The number injured you set is set down at 182 acres, and I don't think there is that much at all. Of course I never surveyed the place very exactly, but as far as I can say there is not much more than about 150 acres flooded at any rate, and that is only when there are heavy floods. How the valuator arrived at the figures he has put down in the schedule, I cannot say.

1225. But, perhaps you are speaking of 180 Irish acres?—I am.

1226. Oh, but these are statute acres that are put down in the schedule?—I beg your pardon, I did not know that.

1227. Taking that view of the figures set down here—on statute acres have you any reason to believe that the amount is overstated?—Well, even taking them as statute acres, I think so.

1228. But about 180 Irish acres would, I fancy, be very nearly 197 statute acres?—Yes, but I don't understand how they arrive at 182 acres injured besides. There is a lot of land there very high, and some of it the flood could never get near at all. The figures appear to me to be large, but I may be wrong.

1229. Sir JOHN McKEILL.—Have you seen the map?—No, I have not had time to see any of these, I have been so busy.

1230. Well, that is the only guide you could have in this matter?—I don't exactly understand what might be meant by the words "injured lands."

1231. They mean lands not actually subject to floods, but still not having a sufficient outfall to carry off the superabundant water?—There is a good deal of land of mine like that. I am anxious to know something with regard to the means of taxation in this matter, that in with reference to the tax to be put on the land. Will it be put on the flooded or on the injured land, or upon both?

1232. The lands are divided into lots by the valuator according to their quality and injury, and he puts certain charges for improvement upon each of these lots. He has divided your land into eight lots; he puts down the flooded land for instance, one lot of 149 acres, and the prospective improvement for that is five shillings an acre; then there are forty-eight acres flooded, for which he puts down 5s. 6d. an acre?—Then I see the taxation will not be the same on every acre all round.

1233. It will be on the land set large, a fixed sum taking it as a whole; taking it as an average, after the consideration of the small divisions?—Will the landlord or tenant have to pay—is it known now who will have to pay.

1234. No?—I have none of that land in my possession at all, except about thirty acres, and the only persons who will be benefited are my tenants. Therefore, I would not like to pay for an improvement that I would get no benefit from. I would not be able to get any more rent from the tenants, nor am I likely to ask them for any more.

1235. We are not in a position to answer that question, but you may consider this—that no greater charge can be made on any award that would exceed the estimated cost per acre, put down in the schedule, and not objected to before?—It is not known at all what the taxation will be, I suppose.

Sir JOHN McKEILL.—It is quite impossible to tell, only that we know, that it won't exceed the amount set down in the schedule which you have in your hand.

1236. Mr. BURNES.—Naturally, the taxation would not exceed the benefit which would be derived, and if the valuator says the benefit will be such a figure, you may take it that the tax could not exceed

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Dr. Joseph Tolson.

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 Dr Joseph  
 Telford.

that amount; but whether the incidence of that taxation are to be imposed on the owner or the occupier is another to be determined afterwards by the authorities—we are to make inquiries, learn opinions, but it is not our province to assess the taxation!—I only asked the question for my own information.

1287. Sir JOHN McKAY—I suppose you know your own property pretty well!—I do.

1288. Well, do you think five shillings an acre would be in excess of the benefit that you would derive?—Is it on the 379 acres?

1289. No, per acre—at the rate of five shillings per acre. There are 197 acres flooded, and 149 are put down at five shillings improvement, and forty-eight at five shillings and sixpence!—Well, as regards the 197 acres flooded, I think at the rate of five shillings an acre it would be very well worth that.

Mr Skiffington  
 Smythe.

Mr. Skiffington Smythe examined.

1243. Mr. BRUCE.—Do you wish to make a statement, Mr. Smythe?—Yes, I merely wish to say a word or two with regard to a property in the King's county—Newtown—which, as I remarked the other day, is returned on the schedule as belonging to Lord Downshire, but which is mine. When speaking of the area of the flooded and injured lands, the other day, I was under a misapprehension. I have carefully gone into the matter since, and I think the appointment made by the surveyor is approximately correct. I have nothing more to say as to that. Then, as regards the township of Bishop's Wood—that is returned as Lord Portarlington's, but it is in my possession. With respect to No. 14—Kilmore, in the Queen's county, you will find it on Map B—it is put down as belonging to Edward R. Smith, the representative of Evans miners. Evans miners have nothing at all to say to that. You see the position lying to the left hand side of the coach road, crossing into Monasterevan—now, that is not injured at all; it is considerably above the level of the Barrow, and

1240. You mean the relief would be worth that?—I believe so.

1241. Then, as regards the other land which is saturated, injured, and for which an outfall will be provided to permit of thorough drainage; that too is divided into many lots, but I think the average is about three shillings an acre for improvement; would you think that a reasonable amount of increase in value?—I think it would be reasonable under the circumstances. It won't be of any benefit to me, but it will be to the individuals who rent the lands.

1242. No matter who derives the benefit, would the improvement be worth that?—I believe it would, I am quite satisfied of it. Some of these tenants have very fine river meadows which are constantly flooded, I never saw them look better than they are at present, but if a heavy flood came, they would be lost.

In addition, I, some years ago, sank a very large drain which takes off all the water from the left-hand side of the road. Deriving by it this morning, I saw fine crops of oats, barley, turnips, and potatoes. Then, I should like to have the opinion of the Engineer, as to whether that land on the other side of the road is injured—the drains run through that, and I am not quite sure whether it is injured or not.

1244. But as regards the left-hand side of the road as you come towards Monasterevan, you think that ought to be excluded?—I think it ought to be excluded.

1245. Is it coloured on the map?—It is coloured on the map as injured.

1246. Does the back-water of the Barrow ever come up to that?—No, the back-water of the Barrow never comes up to the road at all.

1247. Will you point out to Mr. Penny the land to which you refer, and he will take a note of it?—Yes. (Witness pointed out the lands in question on the map.)

Mr. William  
 Gillespie.

Mr. William Gillespie examined.

1248. Mr. BRUCE.—Do you wish to give the Commission some information?—Yes. I appear for Miss Magan for whom I propose to give evidence. I am the agent on the estate and I have some witnesses here to examine. Possibly you will allow me to ask them some questions after I make my statement. If you turn to page seven of the schedule for the county Kildare, you will find there returned 1,612 acres of lands stated to require improvement and drainage on Miss Magan's estate. Now in these particular places a loan has been approved already by the Board of Works, under the improvement powers given to them for drainage, and not only for that area but something more in addition, and Miss Magan objects altogether to any taxation being placed upon these lands, everything being done within the boundary of her property where the Board of Works have already approved of works being carried out, and by which water any deposit of water at present will be removed. She is also of opinion that from the position of her estate which is close to the watershed of the bar of the Barrow, if it so happens that any water falls on the land of any person lower down in the basin she should not pay for it. And I may tell you that the amount to be advanced on loan by the Board of Works, and approved of by their Engineers, for doing all the work that is necessary for completely draining her land is less than one-sixth of the cost estimated in your schedule.

1249. Have you any objection to give the figure?—None whatever—I am going to hand you in a report presently on the matter. Already by permission of the Duke of Leinster, half or one-third of the water in that district has been diverted into another river basin

altogether, and by diverting that water it reaches the Barrow in a different direction—for it runs through the land for four miles in a different direction from ancient course, and then ultimately falls into the stream again. In Miss Magan's estate area there is a fall of about forty feet, and the plan approved of by the Board of Works has been to make a direct channel such as the Marquess of Droghda has made below it. Instead of letting the water fall diffusely over the whole place it is proposed to send it direct into the Barrow and so utilize that forty feet of a fall in the most effective way. I wish to point out that your Engineer does not propose to do any work whatever about a place where the greatest inconvenience arises. I have evidence here to show that an unfortunate man living with his family in a house at that place is constantly driven out of his home by the water rising. Now that place is not coloured at all on your map—it is white. And the object I have in speaking to you about this is to show that the works contemplated by Miss Magan will altogether get rid of that water at a place which your Engineer has overlooked. Miss Magan, I may tell you has a number of tenants, and she has also a large tract of land which fell into the late owner's hands some years ago upon the expiration of a lease. When these lands were in the hands of small tenants they went to the expense of sinking an excavation nearly in the line now proposed, but unfortunately they were tempted to fill in that excavation and put paper in it for the purpose of bringing the water to cuttle. Now these papers have become broken and perfectly useless. I merely mention this to show

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Mr. William  
Gillies.

about a quarter of a century ago bringing the water off in the direction I have named was a contemplated improvement by the tenants. Advantages have been taken of that excavation now for the purpose of relieving the property of the tenants. Miss Magan bears the whole cost, and does not ask the tenants to pay anything. She proposes to do the work at her own expense. I will show you the plan here upon the maps (maps produced). I have a coloured paper pinned on showing the boundary—the yellow is the boundary of the works agreed to by the Board of Works, the green represents what your maps show as impassable, and the blue is what is subject to flooding. The red line represents the new channel (the original channel was choked up) that is to be made in continuation in a straight line with that made by the Marquis of Drogheda some years ago, so that the water, instead of travelling round in various channels, will run direct, and one of the effects will be to make the channel discharge the water which gives these poor people so much trouble at the corner of the cross roads. The water from other estates passes under a culvert under the road, and there is no way at present for it to get away from this place. You will get evidence presently that the water sometimes six inches over the road there, and sometimes eighteen inches in the houses. Even last winter, notwithstanding the small rainfall, the water was at the houses there. My object in alluding to this matter is to show that a far more effective remedy for the existing state of things has been provided at the private expense of the landless than is proposed by the scheme here, and the best got a loan of £500 for the purpose. Mr. Heever, on the part of Lord Drogheda, has objected to these works being carried out. I will read a letter for you presently from the Board of Works on the subject. Now, with reference to another part of your inquiry—a portion of the land enclosed blue is a large turf bog that you could do nothing to improve. If you succeeded in having your engineer's scheme carried out, and gave a fall in the river between Akhy and Manantranan of from nine to ten feet or more, this place is eight miles from the mouth of the tributary river, which discharges itself into the Barrow, so that if the main river is made ten feet deeper than at present it will not have the slightest effect upon these lands, for, if you succeeded in getting a fall of nine or ten feet into the Barrow, and divide that fall over the seven miles, it is perfectly evident that so far from any benefit being derived by Miss Magan's lands, it will not have the slightest effect upon them, because once the water passes her boundary she has nothing whatever to say to it. The pencil line on the map represents the drain made by the Duke of Leinster, and he very kindly permitted the waterbed of Bonthills bog to be altered by a channel cut into his premises, to the canal which was originally intended to bring turf to Eagle House, and consequently a large stream which formerly came into this waterbed, now goes another way. I observe that a sum is put down as the improvement value of bog lands here which it is physically impossible to improve. If you cut the turf further you will only make a lake, and there is no possible outlet for the water. I see in regard to this bog, your engineer points out certain places marked blue as flooded. I may tell you that that is right in the middle of the bog.

1250. Sir JOHN McKENZIE.—The engineer marks a good deal more as flooded than you say is?—Not that I am aware of. I dare say he was not aware that we made this cut, and that the water went another way altogether. He may have believed that it went in the ordinary basin of the district.

1251. But has the cut been made?—Yes it has, and is settling, and the land is kept perfectly dry. I had Mr. Hade, the officer of the Board of Works, over there within the last fortnight, and we actually walked in the bed of the old stream.

1252. Colonel CARRIS.—When was that cut made?

—Some years ago. It is a portion of our work now to clear it out—it has got silted up a good deal. The whole watershed of that bog, I should state runs northward and westward, not southward and eastward as your plans indicate.

1253. Where does it run into?—It runs into the stream which drains all that district, and instead of going out at the end of the lands of Killybeggan it goes down about four miles before it joins the river again.

1254. But eventually does it fall into the Barrow?—Yes.

1255. Sir JOHN McKENZIE.—It runs into the Nerrey stream I think?—Yes.

1256. And that runs into the Barrow?—Yes.

1257. The Nerrey stream was opened some years ago?—Yes.

1258. And you take advantage of the drainage made there by the Duke of Leinster?—Yes.

1259. Which was carried out as a district arterial drainage?—Yes. And you will find His Grace's property is white on the map because he did that work, and we say that we are willing to do the work here, and also claim to have our lands white on the map. We have got the plans and everything ready for doing it.

1260. Can you point out on the map and define the land which you say is already drained into the Kildare district?—Certainly. (Witness pointed out lands on map.)

1261. This matter must be referred to the engineer for inquiry?—Will you allow me to say there is no reason that I can see—when Miss Magan pays the whole cost of the work, and does not ask her tenants for a contribution of one penny—why the same treatment should not be accorded to her at one side of the fence as was accorded to His Grace the Duke of Leinster on the other side. Because the Duke of Leinster paid his money and got the work done you leave out his estate; we claim the like treatment for a like case. When I consider that there is over 1,000 acres mentioned in your engineer's report as land impassable, and find that in his preliminary report he states that the improvement would come to £9 odd an acre it is a matter of something like £10,000. Now we can do the whole of this work quite as effectively in our own way for £21,000, and therefore I don't see any reason whatever why we should be asked to come under the whim of your scheme, and pay £3,000 additional.

1262. Do your remarks apply to the lands mentioned in the schedule?—My remarks apply to all the lands, and I brought the official paper here to show you. You see on the maps the places I indicate—I tell you approximately what we propose to do—I tell you what the probable cost is, and there are several details that I need not trouble you with. For instance the exact point where the drainage comes in is not just where it is shown on the map, but there are minor things. Some years ago the Marquis of Drogheda made a straight channel in his land adjoining ours, something over half a mile in length, and Mr. Heever, his agent, is under the impression, notwithstanding that I assured him we took away some one-third or one-half of the water, that continuing this straight cut would be prejudicial to his lordship's lands, and he has got the Board of Works to consent to his request to suspend our works for the present. I offered the Marquis of Drogheda, on the part of Miss Magan, to clear the boundary stream for a long distance—for a couple of miles or so—free of expense to the Marquis. His lordship made this channel, but it has been so neglected, and nothing done with it for a number of years, high banks have been formed by the silting up of the current which is very strong, and these banks are now from nine inches to a foot above the summer level of the water which trickles in a narrow stream between the banks. I shall refer to other matters later on.

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Mr. Richard Shaw.

Mr. Richard Shaw examined by Mr. GILLISTIE.

1263. You see the stoward on Miss Magan's property?—Yes.

1264. You know the stream we have been talking of?—Yes.

1265. What is the name of the stream we have been speaking of?—I think it is the Finney river.

1266. What is the width of the new channel which the Marquis of Drogheda made some years ago?—About twelve feet.

1267. Is it not more than twelve feet?—I should say twelve or fifteen feet—it is about fifteen feet.

1268. I think it is nearly a perch?—It might have been.

1269. Would it be a fair representation to say that the banks are nine inches or a foot over the water?—They are.

1270. Mr. BRUCE.—When you speak of banks, what do you mean.

1271. Mr. GILLISTIE.—The deposit made in the bed of the river. Owing to the neglect of keeping it cleared these banks have accumulated. I wish to say that if the original conception of the Marquis was right, the cut required to be the width stated, but it is now reduced to the state I tell you. I now offer evidence that where no works are contemplated by your scheme—in case of the worst places in the district. (To witness). Do you know Callaghan's house, at Killoeggin Cross?—I do.

1272. Did you ever see the water in that house?—I did, often.

1273. Did you ever see the water on the road there?—I did.

1274. Is that a constant occurrence there?—Constant. At a time there is any rain at all, the whole of that place is covered with water.

1275. Does the water come under the culvert from the land on the opposite side?—It does.

1276. If a proper culvert was made at the end of that road at Callaghan's, would the water remain there?—It would not, it would go into the river.

1277. Are you aware that that is the line for improving the lands there, approved of by the Board of Works?—I am.

1278. Mr. BRUCE.—The Finney river, of which you speak just now, and which you say is fifteen feet wide, to what depth was that made—what is the depth beneath the surface of the land?—I should say it is about five or six feet.

Mr. Thomas Callaghan.

Thomas Callaghan examined by Mr. GILLISTIE.

1291. You have been living a long time at Killoeggin cross-roads?—I have for twenty-seven years, and my house is frequently flooded.

1292. What is the greatest depth of water you have seen in your house?—I have seen thirteen inches of water on the floor.

1293. Was the water in your house last winter?—Not last winter. It came up to the threshold of the door last winter, but did not come into the house.

Mr. Gillistie.

Mr. Gillistie's examination resumed.

1297. Mr. GILLISTIE.—There are deep dykes along the road, and there is a culvert under the road, but it is not at all adequate. Part of the work we intend doing is to sink that place, and put a culvert there which will be seven feet deeper than the present one, and send the water in another direction. Now, with reference to the general project for the Barrow drainage. There is a suggestion in the preliminary report that the owners of the lands on which there are subsidiary streams, should send in suggestions. I don't know how far it may be ultimately decided, that the people having lands at the higher levels are to pay for those who may have the misfortune to have lands at the lower levels. But in the event of such a course

1279. And that blue mark which was shown us on the sketch, represents the water in summer trickling through the bed?—Yes.

1280. In winter does the flood water cover the whole of the bed?—Yes, the whole of it.

1281. Does it ever come above the banks?—It does.

1282. Mr. GILLISTIE.—What is the length of that river?—From one bridge to the other it is about six miles.

1283. Sir JOHN McKENNAN.—The drainage which you have spoken of—that was a local drainage under the Land Improvement Acts—was it not?—I don't know. It is quite local.

1284. Mr. GILLISTIE.—The drainage is confined to the place?—Yes, part of that stream forms the boundary between Miss Magan's land, and the Marquis of Drogheda's land.

1285. Sir JOHN McKENNAN.—What is the number of the map which shows the cut the Marquis of Drogheda made?

Mr. GILLISTIE.—Sheet 31.

1286. Colonel GARDNER.—How is that flooded land not included in the application made to the Board of Works. It is included?—I told you it is all Miss Magan's land within the yellow lines.

1287. But I am speaking of the flooded place you refer to.

Mr. GILLISTIE.—Well, I made application on behalf of Miss Magan to the Board of Works. The Board of Works are not allowed to give money, except on application of owners of particular lands. I offered Mr. Harvey to go to the expense of clearing out Lord Drogheda's.

1288. Can you tell me is that place flooded now?—It is in bad weather.

1289. And do you wish to have the land there relieved of water?

Mr. GILLISTIE.—We are going to do it unless we can.

1290. Colonel GARDNER.—Has any application been made as regards that place?

Mr. GILLISTIE.—That is included, and anything that is not included we intend to do. We have gone to much expense; we tried to get the Marquis of Drogheda to agree to have a completely white sheet down instead of a blue one, but nothing would please him.

Mr. Thomas Scott (Sub-agent to Lord Drogheda).—On behalf of Mr. Harvey, I must object to that statement.

1294. Did you ever see the water on the road?—Yes; I have seen the water three or four inches above the level of the road there.

1295. Does that water come from the lands of FERRIS?—Yes.

1296. Mr. BRUCE.—From where?—From Miss Magan's lands. There is a gripe which leads to the gullet under the cross-roads, and the gullet is not sufficient to take the water off.

being adopted, I submit there is one line of examination which, so far as there is any evidence before the public, has been altogether overlooked. It has been found from long experience in a great many districts, that to deal with a river merely as the outlet for a large catchment basin, is not the most advisable way of going to work. The first thing is to reduce the quantity of water to be dealt with to the lowest practicable limit, and then to see what should be done at the points of discharge. I have been a map, and some suggestions which I have put into writing for the consideration of the Commissioners. It will be for the Commissioners to consider how far any proceedings should be taken for an exhaustive examination upon

the lines I suggest, in order to give public satisfaction. With the permission of the Commissioners, I will read these suggestions, as there may be one or two points concerning them about which you might like to ask me some questions:—

"In the matter of the proposed arterial drainage of the Barrow rivers—there having been no reference in the preliminary report, to any other method of effectually relieving the Barrow basins from flooding, but by enlarging the carrying power of the river itself, it is assumed the engineer employed must have been limited by his instructions to that course and to that alone, whereas the experience gained in other cases of like national importance, notably, that of the Loire and Garonne in France as well as in the several rivers of the United Kingdom, demonstrates the imperative necessity there is in all cases of first relieving the area of the catchment basins to the smallest dimensions practicable before it can be determined how far it would be advisable or necessary to enlarge the discharging channel at all. If inquiries be made it will be found that three miles north of Massachusetts all the water of the several tributaries that meet near there can be diverted into another catchment basin altogether, viz., that of the Liffey, and the water from 200 square miles out of 500 miles, for ever be got rid of and made to reach the sea within thirty-four miles, instead of the seventy miles it must otherwise travel to do so, and with only the same fall it will have in the short distance suggested. To obtain this end an excavation should be made in the bed of the river Shie, sufficient to make the water flow to the sea and not to the west, and when the excavation reached the bridge of Rath-sagan it would be from twelve to fifteen feet in depth below existing bed of the river. East of Rath-sagan the excavation from the point where that intervenes between that town and Clongowes should be of varying depths, and for about three miles would be of very considerable depth, but at no point excessively so. From this place onwards the depth would gradually diminish until it was equal to a level with the bed of the Liffey near Clongowes. The soil lies on accompanying map indicates the general direction of the suggested channel. There are, besides this one, several places where other lesser excavations would alter the shed water lines of the Barrow basins and divert the water to catchments where it will do no harm, and no one will be found more competent to examine and report upon them than the Commissioners' Engineer, Mr. Manning, should it be deemed advisable to investigate the question professionally, and the Commissioners that work of relieving the water to him. Some of the water now discharging into the Boyne would be carried in to the Liffey, but increasing the volume of the Liffey by this water, and that of the Barrow district will be attended with compensating advantages both in a sanitary as well as in other ways, for it will materially help in moving out to sea the Dublin sewage that now remains in the river because of the want of force and volume therein, and also in increasing the mill power of the Liffey. The fact of having had to come before the Commissioners as agent for Miss Magnan, whose estate was proposed to be included in the schedule of lands to be dealt with, must be my excuse for submitting my views to the Commissioners as to the enlargement of the scope of their inquiries and as to the best mode of carrying into execution the great work they are engaged upon."

These suggestions are accompanied by a map on which Miss Magnan's property is coloured yellow. (Handed in documents.)

1298. Sir JOHN McKEEVER.—You refer to a report as having been published regarding the scheme for the whole district?—I refer to the preliminary report of Mr. Manning, which I have here (showing newspaper cutting).

1299. That is a departmental memorandum submitted to the Treasury?—He states in it that he is reporting Barrow drainage plans, and he mentions the various considerations involved. I told you that the Marquis of Drogheda objected to Miss Magnan going on with the proposed works, and the result is that the Board of Works has for the present suspended them. Here is a letter which I have received.

"Lett. 12,544.

"Office of Public Works, Dublin,

"15th June, 1885.

"Sir.—I am directed to inform you in consequence of reports made on the part of the Marquis of Drogheda, the Board consider it advisable to stay proceedings in respect to the loan, and it will therefore be unnecessary for the present for Miss Magnan to execute the bond set her. The

Board will instruct an officer to proceed to the lands and report on the points in dispute. The Board's decision will be communicated in due course. Meanwhile, of course, no works will be executed. By order of the Board.—W. B. Seely."

1300. Mr. BARNES.—I should like to ask you has that loan been passed?—Yes, for £800.

1301. Has not there been an arrest of the proceedings?—Yes, by that letter. I saw Mr. Hade last week on the lands and he could see no reason why the objection was made. I could get no information on the subject of the objection.

1302. You say the loan was granted?—Yes.

1303. It is quite possible that what you mean is, the specifications were approved of?—No, the loan was approved of.

Here is a letter dated May, 1885:—

"I am directed, for your information and guidance, to send you the accompanying copies of the report, estimates, specifications, and plans of the proposed works on Miss Magnan's property, as approved of by the Commissioners."

That is merely that the report, estimates, specifications, and plans have been approved of?—They approved of everything, and they sent me the bond for execution. I tell you, as I told Mr. Hervey, if the Board of Works does not give us the money we will do the work ourselves.

1304. Sir JOHN McKEEVER.—I want to know whether your objection is to any part of Miss Magnan's property being included in this general scheme?—Certainly.

1305. Because you can do the work yourself?—Yes.

1306. Do you wish the whole of her property to be excluded?—Yes. I should tell you that should anything occur to prevent us carrying out this work, our objection to that scheme goes further, because it does not remove the difficulties under which we labour, nor can it do so in the nature of things, because the principal part is left out.

1307. You refer to a further improvement after the arterial drainage is carried out—to the execution of private thorough drainages works?—No; what I object to is, that no provision has been made, for instance, to meet the case of that man Callaghan, who was examined here, and who has been suffering from floods for the past twenty-five years. There is no provision made in your scheme for relieving the difficulty that that man and his landlord labour under, nor for some others.

1308. Mr. HARMAN.—But you cannot tell that from your map. The Engineer of the Board of Works may have contemplated sinking that place and building another culvert?—If you know the locality as I know it, you would be aware that there is no opportunity given for doing that—you would know that it could not be done—and, therefore, the engineer very wisely avoided it. The works he proposes in this scheme would have no effect on that place, and, therefore, you see, he left the space white, but coloured blue and green wherever he expected results, or proposed works.

1309. Sir JOHN McKEEVER.—How do you know the works he proposed?—Simply from the maps before us.

1310. But they don't show the works—they show the lands proposed to be relieved?—Well, if you look to the spot in question you will see there is only about six inches fall available for any work which could be done, and anything you could do within that space without having this new cut would be perfectly useless in removing such a depth of water.

1311. I have no doubt the engineer has fully provided for the relief of all the lands which are now injured, and for the relief which you now want to do yourself instead of having it done as a general measure on the part of the public?—Excuse me, he makes no provision whatever for it, nor does he profess to do so by his plans.

1312. Don't be sure—you don't know what he has provided for?—I am sure of it.

1313. Mr. HARMAN.—The effect of that private

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Mr. Gilligan. A

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 Mr. Gillispie.

drainage which you propose on the part of Miss Magan will, of course, be to send the water down quicker on the lower proprietors?—Yes.

Mr. SCOTT.—That is Mr. Harvey's objection.

1314. *Witness*.—Excuse me. Permit me to qualify that. If at one end we take away between one-third and one-half of the water, to my mind it does not at all follow that sending down the remainder more quickly will injure the lands below.

1315.—Mr. HAMANN.—We will pass from that. You stated that the new watercourse which the Marquis of Drogheda made below Miss Magan's property has been allowed to silt up from neglect.—Yes.

1316. If those works were carried out here and there by isolated proprietors, would not the same objection apply—would not the same thing occur again—and don't you think that the maintenance of the new works should be under the control of a public board, rather than in the hands of private individuals?—No. I am a member of two drainage boards, and I am not prepared to say that.

1317. Mr. BAILEY.—But this scheme which Miss Magan proposes is not under a drainage board at all.—Certainly not; but what I say is this, we will make the cut, we will clear out the existing one, and we will relieve this most obnoxious place. Whether you take the water round or direct, it will discharge at the same point.

1318. Mr. HAMANN.—But if the proprietors below you refuse to participate in the clearing out won't the lands be flooded?—But we happen to be on such a level that we have the mastery.

1319. Mr. THOMAS SCOTT.—The water would come back to the Marquis of Drogheda's land again. Although you may divert the water the result would be that ultimately it would come in on the Marquis's lands again and injure them. First it is proposed to separate the waters, but these may come together again from the Nurney drainage.

1320. Mr. GILLISPIE.—We don't put it back; we merely put it where it always was.

Mr. SCOTT.—But you are making a new channel in the Nurney river, and after it passes Cherry Mills, on the old Nurney, it joins it again, and comes in on Lord Drogheda's property.

1321. Mr. WILKINSON FENNELLY.—I appear here for Mr. Arthur Robert Vemboyle, whose lands are mentioned in the schedule for the County Kildare—the townlands of Killybeg and Cloney—which are very much injured at present, but if this cut were made it would increase the injury very much. Already the river has done an immense amount of injury.

1322. Mr. BAILEY.—Your evidence is that the proposed new cut which Mr. Gillispie has been referring to if made would increase the floods on your lands?—Oh, very much; besides we will object to Miss Magan having an exemption from this scheme. Some years ago we had a proposed plan to embank this stream, and sink it, down the whole way to the river, but there is no outfall into the Barrow.

1323. Mr. HAMANN.—Do you object to anything

which would send the floods down quicker than they come at present, without an outfall?—Yes.

1324. And I believe you took professional advice on this?—Yes, we did. It would cost us £1,800, we found, to sink the river and embank it. The whole of those upper waters come on us.

1325. Mr. CAMBERY.—But if the main river was directed you say it would not be so injurious to you?—Yes; that is if we were brought within the scheme.

1326. Mr. BAILEY.—You don't approve of Mr. Gillispie's scheme?—No. It would do an immense amount of injury.

1327. You see in the schedule the amount of lands of Mr. Vemboyle's stated to be flooded and injured?—Yes.

1328. Are they correct?—I think there is an excess of bog.

1329. In what townlands?—Killybeg and Cloney. They are thoroughly drained at present, at least the bog is.

1330. You have already a drain there?—Yes, the bog is thoroughly drained at present.

1331. What fall have you into the Barrow?—Oh, we have a good fall into the river. The bog lies very much higher than the river.

1332. Colonel CAMBERY.—Are you able to cut down to the bottom of the turf—to the gravel?—We are. Of course that really brings it down to the level of the water, but still the people can take the water out.

1333. Mr. BAILEY.—In our schedule the amount of land stated to be injured in Killybeg is 518 acres 3 roods, and in the observation column it is stated that 382 acres of that are deep bog. I suppose that the 382 acres form part of the 518 acres?—I conclude so, and the same in Cloney. At present there are a number of houses flooded in the same way as Mr. Gillispie alluded to. Whenever there is a flood in the river there are a number of houses flooded on our property, and they have been very much worse of late on the result of the straight out made by the Duke of Leinster.

1334. Very much worse?—Very much worse.  
 1335. That is the Nurney river you refer to?—Yes.

1336. On cutting the bog, there would be 668 acres situated now flooded and injured which would be relieved of water, and the soil put down for that is 4,111, or something about 4s. an acre. I suppose you don't object to that?—No, I think that would be very fair.

1337. There is stated to be 442 acres of deep bog out of the 1,311 acres in Cloney, the estimated increased value put on that land, excluding the bog, would be about 4s. an acre. What do you think of that?—That would be very fair.

1338. Mr. GILLISPIE.—With reference to the question put by the Commissioners as to how far the Engineer proposes to do the work which we may be not provided for, the very fact of his showing no calculating on the plans, and not taking credit for doing anything with regard to it, is *prima facie* evidence that he does not propose to do anything at all with that part.

Mr. James Stewart Kennedy.

Mr. James Stewart Kennedy examined.

1339. Mr. BAILEY.—Have you some observations to offer us, Mr. Kennedy?—Yes. I wish to give evidence on behalf of Miss Flaxing, who is the proprietress assessed in the County Kildare for the lands of Augherm and Derrylea. The quantity of land proposed to be improved is very large—800 acres. It is perhaps the largest in proportion to the extent of the estate that you have. The greater portion of the lands are represented to be liable to flooding. The flooded and injured lands are set down at 750 statute acres in all. 712 of these are stated to be liable to floods, and 78 acres are alleged to be injured by floods, but not actually at any time covered with the water. Now I have to object to the area, for I am informed

that 712 acres are not at any time flooded. I shall point out, by and by, the locality to Mr. Penny. That, however, is not the more important point that I would wish to bring before you, which is this: that some years ago a loan was got from the Board of Works, and private money was expended besides what was borrowed from the Board of Works, for the purpose of embanking this large area of land. A very effective embankment was made, extending for a considerable distance, probably about two and a half miles. There is a charge on the lands still for a portion of that outlay. This embankment has been most effective in protecting the lands from floods; and I would submit that that being the case

we should not be charged an assessment as if the lands were flooded, but we have no objection to be charged that portion of the assessment which is put on the lands relieved from injury but not actually flooded. There is no doubt that the level of the lands would lead to floods, and they were liable to floods at one time, and the lands on the opposite side of the river are still liable to floods; but these lands of Mrs Fleming's have been carefully and successfully embanked and improved at considerable expense. They paid for that improvement, and they ought to be allowed, at all events, some proportion of the assessment, which is very heavy indeed. I don't know how the Commission proposed to deal with these cases, and there must be many such cases, for some I see the proprietors have actually succeeded in getting their lands excluded altogether from the area of taxation on the ground either that they have done such works as they needed, or that they propose to do them cheaper perhaps than it could be done by the scheme, and it may be sufficiently effective for their own purposes. I submit that that would be a very lame way of draining a district, and certainly if they are entitled to be excluded altogether the cowlands of Derryville and Aughrin are entitled to be given some consideration for the work which has been done upon them for relieving them from floods. From what has passed here I would like to make an observation with regard to the general question of assessment of the lands in the area. I am myself a Trustee of some Drainage Boards, and also have had a good deal of experience on many estates in different parts of Ireland, and I have taken a great deal of interest in this subject. I hope the members of this Commission will refer to the Report turned by the English Commission on the question of English rivers.\* I think that Commission came to the conclusion that it was not sufficient, and was hardly fair, to limit the areas of taxation to lands actually benefited, and to the extent to which they were benefited. They distinctly reported that the taxation should extend considerably beyond that, and I think, following the principle there laid down the scheme of drainage of the Thames valley has been framed. By the taxation runs for the entire length of the district in certain zones and at certain rates. However, I would assume that you are going here to consider the matter freely without the embarrassment of local Acts of Parliament—which in England deal with almost every river—and that you take even a wider view than that of the question. I would say that the principle there laid down should be carried out in a much more complete and comprehensive manner. I do not see why it should not embrace the entire water-shed of each river, that is, as regards the maintenance of the main water-way. I would say that every acre of enclosed and profitable land which contributes its drainage or surface water to the river should bear a portion of the assessment of maintaining the water-way. In cases, of course, where the natural drainage is affected and perhaps also in cases where the navigation is improved there should be a special assessment on the lands and interests that are actually benefited; and I would suggest that the estimate should, as far as possible, separate the two items—one charge to be for the maintenance of the water-way and one special charge for such districts as the Duke of Leitrim's and Miss Magan's, which, having been improved by the owners, throw their water into the main river and therefore should pay for maintaining the water-way. There is no doubt that every one having land within the water-shed or catchment basin has a right of free passage for the water down to the sea; but then they should maintain that highway for the water in a proper condition. It is the tendency, I think, of recent legislation—certainly it is the tendency in France and other countries—to tax not only the lands actually improved but all the lands within the catchment basin. Now in this instance, according to the scheme, the taxable area would only amount to about one eighth of the area of the whole of the land of the

basin, all of which ought to bear some proportion of the cost of maintaining the public water-way to the sea.

1340. Mr. HAMARD.—Would you propose two rates—a public rate for the whole locality and another and a larger rate to be paid by private individuals?—Certainly. I would separate the two questions. I would charge a rate for maintaining the water way for the whole area—the profitable area of enclosed lands—and another rate for the lands actually improved. If the evidence of that very valuable commission to which I referred is read you will see that on one side testimony is given to the effect that only the lands improved should be taxed, but on the other hand evidence is given that all the lands which contribute to the fall of water should contribute a portion of the cost. The weight of evidence is, that the entire area of the profitable land in the catchment basin should pay for the cost of maintaining free and unimpeded the water-way to the sea—a water-way which they themselves use and require to use, and if they use the water-way they are bound to assist in keeping it in order. There is another consideration which impresses me even more strongly. It is not proposed to tax the upper lands at all, which is clearly inevitable, for it so happens that owing to the steep declivities in some of the mountains the soil loosens in these upper lands which then become the greatest contributors to the obstructions caused by the floods. They contribute, not only the water which falls upon them and descends at a rapid rate—they have a perfect right to send down the water, no doubt—but then they also send what they have no right to send down, that is the debris and silt; and certainly if they ought to contribute towards a general maintenance rate in respect of the water which passes over the general waterway, how much more have we a right to demand that they should contribute towards removing those obstructions which they so largely assist to create, and towards the cost of keeping the water-way in repair? I think that argument is unanswerable. In France, in the neighbourhood of the Garonne and other rivers, the damage done by the upper waters descending from steep mountain sides is so serious that works of a very extensive character have to be carried out in the gorges on the mountain sides, where there is no drainage whatever required and where the gravel is swept down by the floods from the hill sides in the direction of the rivers, sometimes whole villages are swept away. To prevent this they have to erect barriers in the mountain slopes at great expense. These works are done by the difficult economies and assessed on the entire area. In Ireland, in more level country, the injury is done in a more insidious way, from month to month and year to year, therefore it is not thought necessary to erect those formidable works in the upper reaches of the rivers; but certainly the same principle applies. Whenever the works are necessary to encounter the mischief done by the gravel and debris brought down from those higher lands the cost of them should certainly be shared by the lands which create the mischief. That I submit is another argument in favour of a general maintenance rate. Of course the rate should be a very moderate one, which would vary according to the valuation of the land and, perhaps, also according to the area, or level, on which it lies. It might vary perhaps from 1d. to 1s. an acre or something of that kind, averaging possibly 6d. an acre. But if you charge that over the whole area—eight times that at present proposed to be assessed—it would come to a very considerable sum. As I stated before, I believe the quantity of land at present assessed is only about one eighth of the catchment basin, from Athy up. If the course I suggest were carried out a very considerable sum would be contributed, and fairly and properly and justly contributed by those lands which contribute to the mischief that is done. Now, the total estimate for this work is very large indeed, so large that it would make one at first sight almost despair of its being carried out on the ground that, however valuable the work might be, it would not pay, and that

July 31, 1897.  
Mr. James  
Sweet  
Known.

\* Report from the Select Committee of the House of Lords on Conservancy Boards, &c., 26th July, 1877.

July 22, 1882.  
 Mr. James  
 Stewart  
 Kilmord.

being too easily you would have to pay more than 20s. in the pound for it. That is the case you merely assess the lands which are to be directly benefited by the drainage, and don't hold all those lands liable which contribute to the mischief. If you assess upon all the lands that contribute to that mischief, or that are within the catchment basin, a general rate for maintaining the waterway, then I think you will be able to reduce the assessment on the other lands to a sum that perhaps would enable the work to pay. I am quite prepared to admit, with regard to the lands on Miss Fleming's estate, that a very considerable assessment might be made, but, as I have mentioned, not so much as is assessed in the schedule which, owing to the circumstances I have mentioned is more than a fair proportion, but which of course would not be so heavy at all if such a scheme as I suggest were adopted. Then, there are towns also that should be assessed, because they would be drained. If such a valuation as I speak of is made—separating the cost of keeping the waterway in order, from the cost of rock cutting and sinking the river to the level which is proposed—then we could arrive at how much should be charged to the towns for the lowering of their drainage, and how much should be charged to the adjacent lands where, perhaps, it is necessary to lower the river for their drainage, and how much should be charged over the whole area for improving and making effective the entire waterway. These are the only observations which occur to me. But with regard to the assessment of the entire area, I would like to make an exception which I had nearly forgotten. We all know that—and especially it is the case in the upper reaches of the river—plantations have the effect of delaying the run of the water, and that they fasten the soil to some extent, preventing in fact that great ravelling of the soil in the upper reaches of the river that I referred to. I certainly think that those portions of the upper lands which are planted might be exempted from taxation, and ought to be exempted from taxation—that is the only exception I would make in the enclosed lands.

1343. **MR. JOHN McKEILLER.**—Do you generally approve of the carrying out of this scheme for the drainage of the Barrow?—I do, especially if it is carried out in its entirety as a scheme, but if you are going to exclude such estates as those of the Duke of Leinster and Miss Magan, or not charge them with their proportion of the cost for putting the

waterway in order, and keeping it in order, then we should certainly object to that. They may have erected works themselves, as Miss Fleming has done, and they may cast their waters down on the lower lands, but certainly if they are entitled to use the waterway at all, they are entitled to pay for its maintenance.

1342. Have you a personal knowledge of the district generally?—I have.

1343. Do you think the sanitary state of the district would be materially improved if the contemplated works were carried out?—Well, there is no doubt, the general health would be improved. I fancy it is from rheumatism and fever that the people suffer in the district, but I think the population in it is not sufficiently thick to cause any serious outbreak of epidemic from that cause. There is this, I would say, however, that I think the whole climate would be improved, and that is a very important consideration. The climate would be very largely improved, and therefore the crops would be improved. With regard to the assessment, there is just one other point I would like to mention. You know, it is patent from the recent Board of Works' report just issued, that the landlords are not borrowing much from the Board of Works, except for the improvement of their own lands as occupiers; and it is hardly to be supposed that they would like to become even collectors of this proposed drainage rate, although it might be recovered to them by the tenant. If any State contribution is contemplated, or is likely to be made, I certainly would suggest that it ought to be made on the ground that perhaps it would be more politic to make such a grant than to collect a tax from the very small occupiers. Therefore, if any occupiers or labourers or others who occupy very small patches of land under a certain valuation, see to be exempted, it would be a fair ground for asking the State to contribute to that extent; but otherwise, I think the catchment basin ought to be able to bear the entire cost, and I would be very sorry to think that it would not pay for doing the work that is necessary for drainage purposes.

1344. **MR. GILKES.**—The last witness mentioned Miss Magan's property. Now on her part I may say that she would be quite willing to bear any rate the Commission should think desirable, for putting the waterway in order, and keeping it in order. She is quite prepared to pay her share of that.

Mr. James  
 McNeill.

1345. **MR. HANCOCK.**—Do you wish to say anything?—Yes, I wish to say that upon page 6 of the schedule for the county Kildare, I am improperly described as the owner of property. I am put down as the owner of Ardaghmore. I am not the owner of Ardaghmore—if you better it upon me I will be happy to join in the drainage scheme.

1346. Do you wish to have that corrected?—Yes, for it is at present owned by a person named Robertson. I am the heir in case the Robertson family dies out of that part of the McNeill estate. Then as regards Ballymahara, I am only the owner of half of that; from the number of acres set down in the schedule, I think the entire townland must be three times what I own.

1347. How much do you own of Ballymahara?—Fifty-two Irish acres only, and in the schedule they have put down 104 statute acres. What I would propose is, that before there is anything carried out, or any regular taxation made, that all these lands should be surveyed again, and that the owners should get formal notice to meet the surveyor, or get some person on their behalf to meet him and point out their respective lands. Again, with regard to Ballymahara, I don't think the sinking of the Barrow would be of the slightest benefit, or could improve it in any way. Some years ago I drained for my tenant there, a portion of his land which is here denoted as injured. The drains are filled in with broken stone in the ordi-

**Mr. James McNeill examined.**

nary way, and as regards completely draining the place, all we have to do is to sink the grips. There is a four foot fall into the grips and ditch, and I don't want any more drainage. This is a long way from the river. In Youngstown I am described as having forty-one acres flooded; well I don't believe there ever was a part of that flooded. There is a river running there, it is the meadow between the Macgus of Draghda's estate and mine. I dare say if that were sunk they would be a better facility for minor drains, but there is none of the land there flooded. I have no doubt that the seventeen acres of injured land comes nearer to a true description of that neighbour-hood. At the outside, I would say that the extent of the injured lands that would be probably improved if the drainage scheme were carried out, might be twenty acres.

1348. Do I understand you to object to the description of these lands as flooded?—Yes; there are none of my lands there flooded, and besides, I am put down in the schedule as being the owner of a great deal more land than I possess.

1349. Your objections are being taken down, and the valuator will have an opportunity of seeing them and offering his reasons or observations?—I would suggest that if the valuator or engineer goes to the lands again, I should get notice to meet him to point out my boundaries.

1350. Do I understand that when Mr Fitzgerald first visited the lands you did not get notice?—No, I never knew that my lands were going to be taken

into this Barrow drainage scheme at all until this day week, when I got this notice, that was the first intimation I had of it.

July 21, 1881.  
Mr James  
McIlroy.

Mr. William Gosses examined.

Mr William  
Gosses.

1351. Mr. BAILEY.—For whom do you appear?—I appear on the part of Major Berrowes, whose lands you will find described upon page 3 of the Schedule for the county of Kildare. It is only a few days since he gave me these papers and asked me to attend the inquiry here to-day; but he did not give me any instructions as to what his wishes were. I have been his land agent for some years, and I wish to make one or two remarks as regards the estate and the particular in the schedule. Now, in Carrigill Lower there are thirty-five acres two roads described as being flooded. I believe that is not in his possession at all, but that it belongs to Miss Kennedy. Upon Culravenna Major Berrowes lately expended about £500 in making drainage for the benefit of his tenants, and to the best of my belief and information the whole of that property, as well as the other items that are named in the schedule as belonging to him can be all directed to his satisfaction without the aid of the Barrow drainage scheme. That is to say, he has sufficient fall to bring up the drainage to improve his property without having recourse to a large work which would be at a distance of from eight to ten miles from his property. Might I ask at whose expense are the tributaries to be worked, or carried up from the main drainage to a property lying at a great distance from it, such as Major Berrowes's?

1352. What is the name of the tributary in the instance?—It is a stream with two mills upon it—the Tappens mill and the Ballyshannon mill, both four mills. It is the same stream that Mr. Modliart has been speaking about, and it runs through Sir Erasmus Berrowes's property also.

1353. It is a branch of the upper part of the Finery river I imagine?—Yes.

1354. The cost of deepening these tributaries would form part of the whole scheme, according to the intention of the engineer?—Some two or three years since Major Berrowes joined Sir Erasmus Berrowes in a considerable expenditure, which they found sufficient for all practical purposes for the tenants who were connected with that stream. Any of those tenants of Major Berrowes who would derive any benefit from the drainage now proposed are, I may say, all men holding under long leases, so that any increase in the value of the land would be of no advantage whatever to the landlord. Part of the property, including the Culravenna drainage, which is held by Miss Fitzgerald, I believe can be effectually and thoroughly drained independent of any such work as that now proposed.

Dr. Martin Darby examined.

Dr Martin  
Darby.

1355. Mr. BAILEY.—You have been summoned, I believe, to give evidence here?—Yes, I am the medical officer of this district, and I have come here in obedience to a summons.

1356. Would you kindly give to the Commission your general observations with regard to the condition of your district in a sanitary point of view?—You mean with regard to the river, I presume, and in connection with the town. We will commence with the town here. First as regards the sewerage, even now the level of the sewers is below the level of the water. Dr. Burke and I visited them about ten days ago in the dry weather, when there was less water in the river than there is now, and at that time with one exception all the sewers were at a level with the water, so that in a flood when the water is perhaps four and five and perhaps six feet higher than it was on that day, the reflux of the water would carry the contents of all these sewers back into the houses, and has done so in several instances.

1357. The general level of the sewers in the town is so low that they cannot discharge during floods?—They cannot discharge at all, except one. They were all, as I tell you—with the exception of one—ten days ago during the dry weather on a level with the water and that one which at the exception was only about eight or ten inches above the level of the water at that date.

1358. Owing to the level of the land in the town being so low when the floods come the back water is sent up the sewers?—The level of the sewers themselves is so low that the people are able to grow cabbages and potatoes over them. These sewers run through their gardens, from the houses into the river.

1359. In fact the level of the land does not afford sufficient fall to sink the sewers?—Yes, and the level of the land is also flooded from the water. In order to render the sewerage capable of emptying itself into the river you should have the sewers built above the level of the land at present.

1360. Does that remark apply to the whole of the

town?—Yes. The town itself is not reached by the water from the river below.

1361. Is there any general system of sewerage in the town?—No general system since the Public Health Act came into operation.

1362. What is the cause of that?—It is the difficulty of getting a proper outfall?—No, I think a good deal of that is on account of the neglect of the Sanitary Authorities in not carrying out the recommendations I made.

1363. But if the level of the land and the liability of flooding are such as you describe, surely it would be almost impossible to make effective sewerage?—The only way to make an effective sewer is that the bottom of the sewer should be higher than the present level of the land in order to let it empty itself into the river—the land should be raised in fact or the river lowered.

1364. Have you noticed anything with regard to the health of the town in consequence of the lowness of its situation?—Well, with regard to the health of the town and the country around generally, I have often observed that the number of cases of illness increased—especially lung disease—in the neighbourhood of flooded districts, and there would be a very offensive odour from the ground after the disappearance of a flood, caused sometimes by the evaporation and sometimes owing to the gradual cleaning off.

1365. I suppose the roads coming into this town are flooded also?—The road between this and Athy is flooded. The river crosses the road, and notwithstanding that the distance from the river may be a mile and a half, part of the Electoral Divisions of Ballyhenness and Ballyshannon are subject to perhaps the largest floods that take place in my district. In that district alone there are over 150 houses flooded to an extent of six inches, twelve inches, and sometimes fifteen inches of water. All the lands immediately about are flooded. Without taking into account the lands that are flooded belonging to parties living at a distance in these portions of two small Electoral Divisions of this

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Dr. Martin  
Buck.

district, I counted 158 houses flooded—that is on this side of the Ferry, taking it from Crosskeys to Ferry bridge, counting the houses on to Riverston on the right, and Kildangan on the left, there are 158 houses either flooded themselves or their lands immediately adjoining them are flooded, and of course the damp soaks up into them, if they are not actually wet by the water.

1365. Mr. HAMARD.—Are there not some houses there on the cutaway bog?—Yes; by cutting away the bog the houses are made a great deal worse, for the water absolutely never disappears. The cutting away of the bog in that neighbourhood is an injury to the entire district, for the water reaches a lower level and is retained—the waters remain there fully ten months out of the year.

1367. Mr. Sydney Jennings.—I wish to make a

correction in the schedule in the Queen's county. It is only a typographical error. The estate of what is called Edward MacNash, representative of Edwards, minor, should be Edwards and MacNash, minor.

1368. Mr. BRYEN.—Have you any other correction to make on the schedule?—No; not on that schedule. There is in another schedule a misdescription—that is in the schedule for the King's county, page 2, number 25. The townland of Stranata is put down as being the property of Colonel Gaise, and it is the property of the representatives of Major Armstrong. There is a very large area of land comprised in the estate, of which I am agent under the Court of Chancery, and there are a number of tenants here who wish to be examined as to the injury they sustain by the floods.

Mr. BRYEN.—We will be happy to hear any evidence they may wish to give.

Mr. Joseph  
Fennell.

Mr. Joseph Fennell examined.

1369. Mr. BRYEN.—Where do you live?—I am an occupier of land in Inchacooly.

1370. How much do you hold?—45 acres.

1371. Is it much flooded?—Yes, in some part sometimes my corn crops and produce crops were all covered by the water, and sometimes we used to remain up all night to make dams on the banks around the land in order to prevent the floods from destroying the whole crops.

1372. Is the whole of your farm subject to flooding?—No. There is between 700 and 800 acres in the townland and there is only 100 acres of it from floods.

1373. Does the water come into your house?—Not actually into the house, but it comes close up to it.

1374. Do you think that a great deal of benefit would be derived if the river was so much as to relieve you from the floods?—I am sure it would be a great benefit, for the water sometimes does not take its usual course—it comes back again.

1375. You would be willing to pay for the benefit done, I suppose?—Yes, if it was not too high. If it was too high we would not be able to pay.

1376. What kind of land is it that is flooded—is it bottom land that grows meadow on?—Bottom land that grows meadow and pasture.

1377. You get hay from it sometimes?—Yes, some seasons.

1378. Good meadow?—No, a very light crop, from 17 cwt to 18 cwt an acre, sometimes less.

1379. Is it gravelly soil?—No, sandy soil. There are two rivers running round the townland.

1380. How many acres of your land do you say are flooded?—About 25.

1381. Mr. Sydney Jennings.—I am prepared to answer any questions you wish to put to me about these lands. There are 1,123 acres in Inchacooly flooded, and the destruction of crops upon it is dreadful. The water runs over the entire of the land, 3 to 4 feet deep in parts, and the quantity has been very much increased since the Duke of Leinster's operations were carried out on the Black River, which discharges itself into it.

1382. Have you observed that the drainings of that district have increased the floods?—Certainly, it has increased both the volume of the water and the rapidity with which it comes down. These are, with some exceptions, good lands; there is a great depth of alluvial soil: some of these lie on a sandy bottom and others on a gravelly bottom, and I have no doubt that anything that could be done to keep the floods off or even to assure the persons getting their crops not to talk of a thorough scheme at all, would be most advantageous.

1383. Speaking generally, do you think that the value of the improvement as put down in the schedule is a fair value for the townland?—I am quite sure it is—if the value would not be more. It is hard to say what would be the value of the crops totally lost.

1384. Mr. HAMARD.—You think it possible that the improvement would be even greater?—I think so, for there would be a certainty then of getting a crop after its being sown. In former years the crops were much more luxuriant than at present, and they are accounted for by the greater amount of the floods, the greater frequency of the floods, and the greater length of time that they remain on the land.

1385. Is this land at the junction of the Slade river and the Fiddle river?—No—the junction is nearer the town. The land runs out at an angle, the Black river goes round one portion of it and the Barrow at the other. The townland of Ullard is very much flooded, but not to the same extent. Now the townland of Lee I call harder land, but there is not such a great extent of that flooded as Inchacooly; still it is flooded to a certain extent.

1386. Mr. BRYEN.—On the whole you think that the scheme would be very beneficial and to the full extent, if not more than what is set down in the schedule?—I do, most undoubtedly. If something is not done I do not know what to say about the lands, because the uncertainty of getting in the crops is completely disheartening the people, and they are getting quite indifferent as to whether they hold the land or not.

1387. Mr. HAMARD.—It is growing bad grassland.—It is becoming much worse than in former years. The quality of the crops is very bad—very indifferent indeed, far different from what it used to be in former years, when cattle used to be fattened upon adjoining lands of a similar quality.

1388. Do you think it would be fair to impose some slight tax on lands not immediately injured by the floods but adjoining?—Yes, I endorse the statement made by Mr. Kinneil just now. I think the whole area of the basin should contribute more or less, for there is no doubt it is from the surface waters that the great body of the silt is brought from the signature of silt at the river's source, at Bultin in the mountains. Of course that silt could be prevented in such a way as in no way to affect the drainage of the Barrow, but it must be remembered that it is the great cause of the filling up of the river. Where there is such an expensive and extensive scheme as is proposed to be carried out here, I think that remote lands should bear some small proportion of the expense, I mean any of the lands within the watershed of these rivers. If you would kindly permit me, I would like to make some observations with regard to the town of Farnham. As I told you the other day, I have been living there for some years, and I had occasion to analyse the water in a rough way, for my own purposes. I did so with permanganate of potash, and it showed a great quantity of organic matter. Several persons in the town asked me to make a similar analysis for them, and I always had the same result. There is not a well in the town, except one on the Millly path near the King's county, that is not tainted. I have known

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a public well in the town having been analysed by Professor (now Sir Charles) Cameron, and he found it to be of the foulest description. The town stands upon a sandy bottom, and all the impurities run into the wells. To my knowledge there is a regular succession of wells and cesspools in the town—cesspool, well, cesspool, well, in rotation. Frequently the cesspool is higher than the wells, and I don't know how the people escape being poisoned.

1888. Sir JOHN McKEOWN.—Do you mean to say that the cesspools and the wells are in close proximity to each other?—Well, in my own case, my cesspool was sixteen feet from the well, and I need not tell you, I did not use the water.

1889. Mr. George Brewster.—I have come from Portarlington. Recently, Mr. Charles Champ made a statement, implying that seventy-five men employed by a contractor would do as much work as 150 men employed by the Board of Works, and he based his calculation on the carelessness of the men employed under the Board of Works at the Rathangan drainage. Now, if that is the case, the sum proposed to be necessary to do the works here, in far in excess of what they otherwise should cost to be effectually done. In the report of the Board of Works, recently issued, it is stated that £100,000 has been used for emigration. Now, I came over from the United States last January, and I know that that emigration caused a great deal of dissatisfaction in the United States, and I say that the use of that money in such a way—

1891. Mr. BARRY.—I think this has nothing to do with the inquiry. Well, sanitation has increased for the last three years, and I say that the people who have been obliged to go into the workhouses, should have been provided by the Board of Works with some employment.

1892. We cannot go into these matters—they have nothing to say to our inquiry.—Well then, I can speak about the atmospheric effects of the flooding in Portarlington. I recently, as I tell you, came over from America, and I say that the atmosphere in Portarlington is far worse than the atmosphere in Kansas City. Property has been depreciated in consequence. I have known houses there idle since the year 1879, and a gentleman when asked to take one of these houses, so far from paying any rent for it said, "he would not take £300 a year to live in it. After the flood last spring the pump water became stinking although before the flood we could drink it. Even the sewers too are quite close to the houses, and the river is not able to carry off the sewage. I notice by the papers that there have been 1,761 deaths from cholera in Spain last Sunday—that is a nice state of things for consideration here when we are dealing with the town of Portarlington. Then we have cases of scurvy at present in Portarlington, there are two cases as stated here in the police barracks, and I know that there is a filthy open sewer at the rear of the barracks, and there is such a bad smell that you could not stand over the pump there.

Mr. Thomas Scott, continued.

Mr. Thomas Scott.

1893. Mr. BARRY.—Have you seen information to give us?—Yes, I am put down in the schedule for Philipstown, in the county of Kildare, and I have in object to the quantity of land set down.

1894. Do you object to the ninety-one acres that are described as flooded?—I do.

1895. How many acres do you say are flooded?—About twenty less.

1896. That is you say there are about seventy acres flooded?—Yes. I would like to add as Mr. Medlicott said, that I would be glad to get notice when the surveyor comes down to examine the place that I might have an opportunity of meeting him and going over my property with him.

1897. Have you any objection to the area of forty acres described as injured?—There is a great portion of that I object to. There is a part of that a high hill which could not in any way be affected by the water.

1898. You are aware that in this schedule the figures given are statute acres?—I am.

1899. Have you examined the maps?—Yes, I had an opportunity of looking at them.

1900. Now looking at the Kildare portion of the map, can you point out the parts you wish to exclude?—Yes there is a coarse Irish field which never was flooded at all and is marked green.

1901. What do you say as to the value of the proposed improvement?—I think it is too high. I could not afford to pay it. My rent in the townland is only £20 a year, and there are nearly 160 acres and they charge me £25 for a portion.

1902. The present value of the land is set down at £15 1s—do you object to that?—I do.

1903. Sir JOHN McKEOWN.—Is it too little or too much?—It is too much. The flooded part is too high.

1904. Mr. PEARCE.—I have received the following letter from the agent of the Duke of Leinster:—

"48, Lower Dorchester-street, Dublin,  
18th July, 1885.

"Dear Sir.—In reference to the schedule of areas to be leased, under the River Barrow Drainage Scheme, on the part of His Grace the Duke of Leinster, I write to inform

you that His Grace having fixed rents for the next fifteen years by mutual agreement with most of his tenants, would decline to participate in the scheme proposed, unless the tenants undertake to pay the amount.

"I am, sir, your obedient servant,

"CHARLES R. HARRISON."

"To the Secretary,  
Barrow Drainage Scheme."

1905. I have also received the following letters:—

"Mount Lucas, Philipstown,  
"July 18, 1885.

"Sir.—In reference to the valuation schedule of land flooded by the river Barrow and tributaries, I beg to state it is perfectly preposterous to describe 118 acres of the lands of Drumana as 'flooded,' and I may say the same as to the lands of Ballyphage, Ballypore, and Eskerbeg, of which 184 acres are described as flooded, and 100 as injured. I know those lands for some fifteen years, and never saw a quarter of the area stated flooded, and since I, some five years ago, at great expense, carried out certain works on the portion of the Philipstown river draining the lands of Drumana, Eskerbeg, and part of Ballypore—these lands have only been flooded to an infinitesimal extent, and what floods did occur were of very brief duration, as well as of a very small extent indeed. Even this small area would be easily freed from flood, and I would so free it, if a certain bridge were rebuilt, and as a precaution has been passed for the purpose, it may be presumed the work will soon be carried out. I must also protest against the assumption that these lands would be injured by anything like the extent claimed, it being a doubtful point whether lands liable to flood are, taking one year with another, made more valuable by drainage, and I am satisfied that it is more than doubtful in the case of some lands to which the schedule refers. I would further remark that as under the regime of the Land Commission, landlords get practically no benefit from their soil; it is not to be expected they will favour such schemes as this. On the whole, then, I must be written as strongly opposed to any scheme at all based on the figures contained in the above-mentioned schedule. I may mention that I should appear as reputed owner of the lands of Drumana, Eskerbeg, and the, at least, greater part of Ballypore—page 4 of schedule.

"I am, sir, yours obediently,

"B. M. BALL.

"The Secretary,  
"Barrow Drainage Commission."

K 2

July 31, 1864

1804

" Estates Office,  
 " Brunswick, Newbridge.  
 " 18th July, 1864

" Sir.—On behalf of Mr. John La Touche, of Harristown, for whom I am agent, I object to have that portion of his estate quoted in schedule, viz.—Lipstown Upper, Lipstown Lower, and Ballyconnet, charged under the

Barrow drainage scheme, on the grounds that the lands cannot receive any benefit at such a distance. Mr. La Touche expended several hundred on that portion of his estate in drainage, some years since.

" I am, Sir, your obedient servant,

" J. M. CURRAN.

" J. S. PENNY, Esq., Secretary."

Mr William  
 Hopkins

Mr William Hopkins examined.

1807. Mr. BRUEN.—Do you desire to give any evidence?—Yes, I appear on behalf of my father, Thomas Hopkins, whose lands are mentioned in the schedule as Black Hall, in the county of Kildare. My father objects to the amount of land put down as injured—140 acres. I don't think there is more than eighty acres. There is a good deal of the land deep bog—thirty acres,—and he considers that he has the drainage in his own hands. He does not see why he should be brought into this matter. The only thing that touches our property are the mills at Ballynashannon.

1808. Is the whole of the townland in your father's

hands?—Yes, the whole of Black Hall is in his hands.

1809. But I suppose it is a much larger area than is comprised in the schedule?—There are 400 acres in the townland, I think.

1810. About how much of the land do you estimate is now injured by water?—About eighty acres, I think, that could be improved.

1811. Eighty statute acres?—Yes; and my father considers he can improve that land himself, and I object on his behalf so to be brought into this work at all.

Mr John  
 Cullen

Mr. John Cullen cross-examined.

1812. I live near Ballybaiton, but my holdings are in Inchacooly and Lea. I hold about 135 acres in Inchacooly which are protected by an embankment erected over 100 years ago, and eight acres (all Irish) unprotected, the townland of Inchacooly contains about 1,700 acres statute, some 1,400 of which are completely subject to every high flood. The lands protected by embankment are some valuable when the lower lands are flooded, I pay about 30 per cent according to the Government valuation, higher rent for the unprotected land than for the protected portion. Some wet seasons the eight acres are worthless, but when dry seasons follow they are very productive in consequence of the alluvial manuring left on the ground by the floods, this observation applies to all the low lands of Inchacooly. Mr. Jennings, the agent over those lands, stated to the Commissioners at Portlannington, that the owners of those lands suffered enormous losses by defaulting tenants, the natural consequence of the frequent floods, he could have stated also, that the full rent was paid for my holding the beneficial result of the embankment. It would be therefore unjust to impose a tax, on my holding after depriving it of its peculiar advantages.

Mr. Scott.—Why so much as 12s. 6d. the statute acre is put down as improvement for part of Inchacooly.

1813. Mr. Cullen.—Well the tenants might as well leave the lands at once in Mr. Jennings' hands, and I tell you in Mr. Jennings' hands it will be if any such charge is imposed. I heard Mr. George say at Portlannington before this Commission that a great part of Derrylea was worth £4 five or six years ago, but he could scarcely get £1 an acre last year. That was quite true, and that is chiefly owing to the depression of the times, and the want of means on the part of the people who need to take this hay in concern. Mr. Harvey, the Marquess of Drogheda's agent, gave evidence to the same effect. He showed that Bakersdown was at one time worth £4 an acre, but £2 an acre could not be got for it now. Last year mowing was very easily saved, at very little cost. My lease has expired, and I have to make a new rent with my landlord—the English Court of Chancery; and I think it right to tell you here what my position is as a tenant after thirty-three years leasehold. I think it would be a marvellous thing to put any such charge as proposed upon the lands, and that no one

would suffer more than the landlord of Inchacooly if such a high percentage is adopted. The same would apply to Derrylea, though I have nothing to do with that; but I have as much experience as any man here as to the effect of drainage and the effect of cultivation.

1814. Mr. BRUEN.—Have you ever lost any of your crops?—No; I never lost any, except eight acres which are not protected by the embankment, but in some years these eight acres would not be worth two pence an acre, owing to the floods having got at them. The remainder of my holding was all protected by the embankment erected there over 100 years ago.

1815. Have you looked at the detailed map to see if more than eight acres of your land is included amongst the injured lands?—I have not, I am depending on Mr. Jennings to fix my rent for me, and I suppose he will look into all these things, but I wish to say to Mr. Jennings that if anything like what is stated here to be the proposed increased rate, or one fourth part of it, is put upon Inchacooly I will have nothing whatever to say to it, and it will be left there.

1816. Mr. KILMER.—It has been suggested to me that if some more tenants of this class would come in and give evidence and express their opinions, it would be of great value. The idea in the district is that the taxation is to be about 10s. an acre, and that it cannot be paid, and that therefore there is no use in coming forward to give evidence at all. It would be well that you intimating that you would be ready to hear any tenants who come forward. The case which this gentleman has just made in the case I made. It would be most valuable to get more witnesses of that class.

Mr. BRUEN.—It should be clearly understood that we are quite ready to hear any evidence that may be tendered to us.

Mr. Jennings.—There seems to be some misapprehension as regards the second column of your book with regard to the unimproved value. The people appear to think that that is to be the rate that it is to be imposed.

Mr. BRUEN.—The last column in the schedule is simply the probable increase to the present actual value of the land that is to be drained and improved—that is the estimate of improvement which Mr. Fitzgerald, the valuer, puts upon the improvements that will be effected

That is to say, he estimates that the lands will be worth that much more than they are at present.

Mr. Jennings.—But it has no connection with the rate for the execution of the works.

Mr. Scott.—Nevertheless the work would be undertaken upon that basis.

Mr. Evans.—It does not follow at all. The improvement and the value of the land would be probably taken as the basis for fixing the rate.

1817. Mr. Scott.—That is what we object to—that it is too high. There is 12s. 6d. an acre down for some of the townland Mr. Cullen speaks of—that is equal to £1 an Irish acre—that no tenant could afford to pay.

1818. Mr. Cullen.—I remember the time when a great flood came, after I set the greater part of my meadows in commons, and I got £1 an acre more because the land was enclosed by the embankment, than I could for the land subject to the flood.

1819. That is to say the lands protected from the flooding were worth £1 an acre more than the lands

which were not protected?—Yes. Speaking of Mr. Fleming's lands, who holds part of Derrykeel—part of that land is high and dry, and if part were flooded and damaged the high and dry land would be worth considerably more than the other part.

1820. Mr. Cassidy.—That would be in consequence of the security of the crops and the fact that the other lands were destroyed?—Yes; but what I want to suggest is that it would be a wrong thing to fix at the higher percentage land that is protected and above the flood so land which is under the flood. It has been suggested here, and I firmly believe it, that great relief could be given for one tenth of the amount proposed. Some time ago the people of Mountmellick made a subscription and obtained great relief in their neighbourhood from Mountmellick up to Slieve Donard; but at the same time it must be admitted that the damage was sent down more rapidly.

Mr. Evans.—In the absence of any more witnesses being tendered now, the Commission adjourns till Tuesday next at Athy at 2 o'clock.

July 21, 1885.

Mr. John Cullen.

## TUESDAY, 28TH JULY, 1885.

July 21, 1885.

The Commission met in the Court-house, Athy, at noon.

Present:—Lord CASTLETOWN (presiding); RA. Hon. HENRY BRIDGES; Sir JOHN McKEELIE; Colonel GARDEN; Mr. HARRARD, C.E.; Mr. HUMPHREY SMITH, and Mr. J. A. CASSIDY.

Mr. PENNY, Secretary, was in attendance.

Lord CASTLETOWN.—I declare the Commission appointed by His Excellency the Lord Lieutenant to inquire into the drainage of the Barrow and that of its tributaries open here to-day. The Commission is ready to hear any evidence that may be offered on the subject. We will first of all hear evidence as to valuation. The maps and schedules have been lodged here, and any gentleman having any objection to make, either to the valuation or the particulars mentioned in the schedule, we shall be very glad to hear them. Does any gentleman wish to give evidence upon the valuation as a proprietor?

1821. Sir Erasmus Storer.—Yes. I wish to give evidence with regard to the supposed increased value my lands are to derive from this arterial drainage.

1822. Lord CASTLETOWN.—Have you any remarks to make with regard to the valuation which has been fixed upon your land?—Before going into any detail I wish to protest generally against being made liable for any loss whatever to be expended on lands which are not in my own occupation. Then, in the next place, I object to the supposed increased valuation put upon my lands.

1823. The lands you refer to are 24, 25, and 26 on page seven of the schedule for the county of Kildare—Whitehouse, Tipperena Lower and Tipperena Upper?—Yes, I am well acquainted with these lands, and as far as my knowledge goes I don't consider that this proposed arterial drainage would improve Whitehouse, Tipperena Lower and Tipperena Upper to the extent of £36 12s. per annum. In the first instance, I believe that it would be only consequent upon a considerable sum of money being expended on thorough drainage that this supposed benefit of £36 12s. would come into play. Allow me to ask this question—supposing that this drainage were carried out who would be responsible for the periodical payments which the Board of Works demands. According to my experience, whoever he would be, he would be responsible twice a year, in April and October, for such payments. Perhaps the Commissioners could inform me on that point.

1824. Our business is not to answer these questions, but to inquire into your views as to whether the drain-

age proposed to be effected would, in your opinion, be effected and successful, and whether the valuation put on your land is, in your opinion, right or wrong. Do you think the proposed drainage would be successful?—I think it would be worse than useless at the present time.

1825. At the present time?—Yes; at the present time it would be worse than useless, for I think it would be a decided injury.

1826. Will you give your reasons for that?—I believe that no owner in fire of that property I would be responsible, in the first instance, to the Board of Works for these instalments of £36 12s. per annum, and then it would be left to me to recover from the tenants according to the acreage land down here the amount. Well, from my knowledge of them, and as far as I know, I think they would object very much to pay any more for their lands than they do at present.

1827. Is the land put down in the schedule as flooded land or injured land?—In the schedule it is called injured land, and stated to amount to 213 acres 1 rood statute. I have looked at the map to-day, and I must say there is certainly a part of these lands which at this season is very much more profitable, according to my mind, as it is at present. I may be wrong but I think it is in a much more profitable state at present than if it were made dry. Especially in a season like this it is most desirable—low pasture for cows and nice coal places. However, I am a tenant of mine here, Mr. Doyle, of Tipperena, and he can speak for himself if he likes.

1828. Sir JOHN McKEELIE.—Have you examined the maps?—Yes, this day.

1829. Are you satisfied that the area of land marked there is correct?—The area—in what way?

1830. In extent—does the land marked upon the map here represent the extent of the injured lands?—No. For instance, the portion that I refer to, and of which the tenant will speak presently, in my mind it will be injured if made drier.

1831. I am referring to the acreage. For instance, in the townland of Whitehouse, that is represented on the map by being coloured?—I think, so far as these lands are concerned, that this drainage would not be

Sir Erasmus Storer.

July 20, 1885  
 Sir Thomas  
 Barrow

anything more than a very trifling improvement, unless there was a considerable sum laid out on thorough drainage subsequently.

1832. That is what the valuator contemplates, and he has marked these lands as capable of being improved, and the thorough drainage when carried out will have the effect of improving the lands at Whitehouse to the extent of 4s. an acre.—Well, I don't think an acre of that would be increased 4s.

1833. Then we have the townland of Tipperman, the acreage is given as 74, and it is stated that the ground is capable of being improved to the extent of 3s. an acre; and in Tipperman Upper we have 31 acres stated to be capable of improvement to the extent of 4s. an acre. Now, that being what the valuator put down, the question is, do you admit that that valuation of possible improvement is fair and right?—No, I do not. In my opinion it is misleading.

1834. Mr. BARRER.—You know the district generally, do you not?—Yes, I have a knowledge of it for the last nineteen years.

1835. And you know the great extent to which it is flooded in the winter?—Injured slightly. Part of it might be injured, but I won't go beyond my own land, because I only see the others in the distance. I have not walked over them.

1836. I am referring not only to your own land, but to the lands in the district generally which are supposed to be flooded—you know them, I suppose?—To a certain extent I do.

1837. You admit that they are flooded to a great extent?—They are injured by water, I won't say flooded. They are not at all flooded to the same extent as the land near Monasterevan.

1838. But I am speaking of the whole district?—I know only parts of it. I know the part about Monasterevan well. Of course any one traveling by the railway in winter will see hundreds of acres covered by water getting flowing from the Barrow.

1839. I think, Sir BARRER, you and I sat in this Courtroom before and heard evidence given of the immense flooding and injury to lands between Monasterevan and Athy?—I have been in this Courtroom before with the Land Commission.

1840. And evidence was then given of the great injury done by flooding?—I think it is very probable it was—it is manifest.

1841. Considering that great injury, don't you think that the deepening of the bed of the Barrow so as to get rid of those floods would be a great improvement to the district?—I think it is perfectly clear that the deepening of the Barrow would be a vast improvement, but then I think I have to take further into consideration whether the advantage I gain is worth the cost as regards this tributary which affects my property, which I could jump across in most places. Some person has very carefully walked up that stream for 8 or 9 miles to discover this insignificant property of mine—a property worth about £400 a year—to find that it could be improved to the extent of £36 13s. I thought I had on my part looked carefully after my property for the last 19 years to develop its resources so far as my intelligence and capital would permit, but I appear to have overlooked this £36 13s. I am quite satisfied that this drainage would not improve my property at Tipperman 5 or 6 per cent,

and certainly not to the amount calculated here. I think the tenants would very much object to pay anything for deepening the Barrow.

1842. But your objections to the scheme, so far as you at present state them, are rather to the taxation than the benefits which would be derived generally from the carrying out of the scheme?—Yes, is the taxation—to an enormous expense being gone to at this present time, and especially when that cost would be thrown in the first instance upon the landlord who has to recover it the best way he can from the tenant who tells him perhaps to-morrow or the next day that he is paying enough rent already. Yet the landlord is to be made liable to the Board of Works for these instalments to be paid punctually in April and October, in my small way I object to it very much. I have got some experience of the Kilmore drainage.

1843. But if a scheme could be devised by which the land could be relieved from flooding at what you consider a fair cost to those who would be benefited by it, would you see any objection to carrying out such a scheme?—I think those who under the Land Act of 1881 would be benefited by any improvement of the sort are the parties who if possible should be made liable for that charge.

1844. That was not my question. My question was that if such an arrangement could be made as that the cost or incidence of taxation would in your view be fair, do you not think that the carrying out of the scheme would be a benefit to the district?—In the first instance there is an "if" in your question. I don't think the measure would be at all fair, if the owner is not made liable.

1845. That is apart from the question. I am supposing the incidence of taxation were such that they would be fair in your view, under those circumstances do you or do you not think the drainage would be beneficial to the district?—I think it would be a benefit to the district at large, but I would not force it down the throats of any one, and I think if the tenants—the men who occupy the lands—wish for it and are made well aware beforehand of the money they would have to pay for it, that it would be carried out.

1846. That all comes back to the question of taxation?—It all comes back to the question of taxation. That is the question to my mind—the money.

1847. But if there was a fair system, by which the taxation would be imposed fairly, then you think the scheme would be a benefit to the district?—I do.

1848. And that all persons who are made liable under such a fair system should join in it and pay their quota to it?—I think that only those should be made liable who will derive a benefit from it. The landlord now will derive no benefit whatever from it. He has no reversionary interest in the land—none whatever. I object strongly to be made liable for it. I have heavy charges already to pay to the Board of Works.

1849. Colonel CANNAN.—How far is this land from the Barrow?—I measured it as the crow flies—from Athy across to this townland it is nine or ten English miles.

1850. Is that the nearest point?—I don't think I am a mile out in the distance.

1851. Does this tributary run into the Barrow nearest Athy?—I think that Athy is perhaps the nearest point. My tenant, Mr. James Doyle, is here

Mr. James  
 Doyle.

Mr. James Doyle examined.

1852. Lord CANNAN.—Are you a tenant of Sir Erasmus Barrer's?—I am.

1853. What farm do you occupy?—Tipperman Upper and Lower, and Whitehouse.

1854. Well, you have seen the valuation of those—have you any objection to it?—I have.

1855. Would you mind stating your grounds of objection?—As far as my farm is concerned, I don't

see what it requires. There is no flooding there, and I keep the river that goes through the farm in good order.

1856. What is that river?—It is a mill-race, and I keep it in the best possible order; and, for my part, I don't think this proposed drainage would be of any service in the world to me.

1857. Is the land at all injured that you have?—

July 28, 1886.  
Mr. James  
Duffy

Not a bit. There's two-thirds of my land too dry. It is a rabbit road.

1858. Sir JOHN McKEILIN.—Have you looked at the map?—I have not.

1859. Is there any part of your land very wet?—No part of mine.

1860. Is there a fall for thorough drainage from it at present?—I would consider there is not in its present state, but if the course of the river were sunk there would be.

1861. Is there at present a fall for thorough drainage?—No.

1862. If a fall was given for thorough drainage would the land be benefited?—I don't think so. We have made foot drains, and a portion of it is two feet deep. I don't think anything more than that would be of any benefit.

1863. Mr. SERRIN.—Are there not other tenants on this property whose land is damaged by water?—But there is none of it flooded.

1864. Yes, but injured?—Well, there may be parts above and below me.

1865. Are there any of these parties here?—No.

1866. And do you expect their land would be a good deal improved if the river and mill-race were sunk, so that they could drain their land from there and a half to four feet?—I think if they keep their land in the same state as I keep mine that they would not require it much. It might improve it a little.

Mr. John McClean examined.

Mr. John  
M'Clean.

1873. Lord CASTLETOWN.—Do you wish to give evidence?—Yes. I appear for Mr. La Touche, of Harristown, and I beg to refer you to page 8 in the schedule of the county Kildare—the townlands of Liptown Lower, Liptown Upper, and Ballymount. On behalf of Mr. La Touche I have to ask that those lands be expunged from the schedule on the ground of distance. The lands are fully thirteen English miles from here. They are four miles further away than the property of Sir Erasmus Boreman at that distance, and I don't see how these lands could be improved by any scheme of the Barrow drainage. There are not very many acres put down no doubt, only 68, and the lands are not put down as flooded, but as injured. Mr. La Touche considers that he would receive no benefit whatever under this drainage. None of the lands are in his occupation, and from the distance alone I am of opinion that no benefit whatever could be possibly derived.

1877. What barony are the lands in?—Ballymount is in the barony of Kilmullen, and Liptown in Netheragh East.

1878. In your opinion, are the lands injured or not injured?—I am not aware that they are injured. I believe they are not injured. I know every perch of the lands. I have gone over them, and I do not see any of the lands injured. None of the tenants ever complained to me of these lands being injured. Mr. La Touche spent several hundred pounds on these lands some four or five years ago, and he is paying large sums still to the Board of Works in respect of them.

1879. Was that for the drainage of these actual lands, or was the money spent upon these lands and others?—These lands and others.

1880. But a portion was spent on these lands?—Yes, a portion.

1881. And was that drainage thorough drainage?—It was.

1882. Is there anything further you would like to say?—I have nothing further to say. There are my reasons—that owing to the distance the lands will receive no benefit, and that there are none of the lands in the occupation of the landlord.

1883. Sir JOHN McKEILIN.—Have you seen the map which has been deposited here for public inspection?—I have not.

1867. But you have not more than two feet fall at present?—Yes; I am not well acquainted with the falls.

1868. Mr. CANNON.—Are you not a mill owner?—Yes, in a small way.

1869. Lord CASTLETOWN.—In your opinion neither your land nor the land above or below you would be benefited if the fall were increased?—I think if they did the same on their land as I have done on mine, their land would be as good as mine.

1870. You say you would not be benefited by the scheme?—I would not be benefited by the scheme.

1871. And your neighbours above and below you also?—I say if they kept their land in good order they would require no more. They allow the mill-race to be choked up.

1872. Do you do much in milling?—Oh, no; the business is done upstairs. We are going to close our mill in a very short time. Six or seven years ago we could work seven or eight months in the year, and now we only work two or three months.

1873. Is that owing to want of trade?—To want of trade.

1874. Has it anything to do with the river?—Oh, nothing whatever to do with the river. It is the want of consumption of oatmeal.

1875. Mr. HAMARD.—Are you ever troubled with backwater?—No; it comes right up through the mill-race. I used waste gates to rise it some times.

1884. Now the detailed valuation?—Except this schedule which has been furnished by Mr. Panny.

1885. Have you got a sufficient outfall for your thorough drainage?—We consider we have; and the drainage of the Barrow, or the sinking of the Barrow from this to Monasterevan or Portlannington, would not by any means assist us.

1886. But there is a tributary on these lands, and the upper and would be opened out to us to give a fair outlet for the water into the Barrow?—Oh, it is a very small tributary.

1887. But do you not think any benefit would be derived from the opening up of that stream?—I don't think that a benefit would be derived which would compensate the landlord for an expenditure of £30 a year. I don't think the lands require the drainage pointed out in the schedule.

1888. The valuator, Mr. Fitzgerald, has put down thirty-nine acres in the townland of Liptown Lower, is that injured by saturation?—I see that.

1889. And he estimates that that would be improved to the extent of 3s. an acre, if the main water-course which passes up through this townland were opened out, and of course five rent given for that water-course into the river below?—It is my belief that it will not be derived.

1890. Have you any outlet now, any means of keeping your main water-course open now?—For five or six years we have not opened up this drain, but Mr. La Touche used before that open it yearly, or portion of it.

1891. You mean drains and water-courses?—Yes.

1892. Don't you think that some advantage would be derived by that water-course being kept open at the expense of the district at large?—I don't think there is any benefit to be derived by Mr. La Touche at all in the transaction. The lands are not wet. I would meet Mr. Fitzgerald any day and go over them with him.

1893. But would they not be benefited in any way?—I don't believe they would be benefited. I don't see how they could.

1894. In Ballymount the valuator puts down 43 acres as being in a wet state and unimprovable, and he estimates that the land will be improved to the extent of 6s. an acre by the works proposed—that is an out-

July 28, 1895  
Mr. John  
McGlashan

fall would be provided for these lands admitting of a thorough drainage to be carried out to a depth of 4 feet?—It is my opinion that the lands would not be benefited in anything like that money, and I question if they would be benefited at all. It is 15 English miles from this place to these lands.

1895. Mr. BAUM.—Is there any wet land at all in these three townlands?—There is no land that I would consider wet.

1896. Is there any rushes on the land?—No; it is a portion of the bog.

1897. Then is it black peaty soil?—The bog is under it. It is turf peat.

1898. The bog under it you say?—The bog is nearer Athy and the lands are further away than the bog, but there was a very large drain made there by Mr. La Touche—a deep drain on the Dundavin side of the bog. From that drain there is a sufficient fall to carry away any water we consider necessary to be removed.

1899. But it drains into the bog—doesn't it?—No. 1900. Where does the lower end of that drain empty into?—It comes on to a place called Battlement, and empties itself at the other side of Athy—not the Monasterevan side.

1901. But into the river?—It is at the other side of Athy. I don't know where it empties itself into, but I know that it does not empty itself at the Monasterevan side of Athy.

1902. What is the length of the drain that was made by Mr. La Touche?—I could not say—I suppose about 400 or 500 perches, and it cost fully £2 a perch.

1903. How long ago was that made?—In 1864 or 1865.

1904. And were you agent on the estate then?—I was not.

1905. And did any other proprietor join in the work?—No, Mr. La Touche made that drain himself.

1906. Then the outfall of that drain is on the bog of Mr. La Touche's property, or actually on Mr. La Touche's property?—I don't know where the fall is after it leaves Mr. La Touche's property, but we consider we have a sufficient fall from the centre.

1907. And there are no wet lands on these three townlands?—None—no lands situated or no land that you would call wet.

1908. Nor that would be improved by drainage?—We think not, sir.

1909. And have you ascertained the opinions of the tenants on that point?—I have not; I have not been speaking to any of the tenants.

1910. Colonel CAHILL.—Was any thorough drainage done by the Board of Works at the time that money was borrowed on these townlands?—Yes; portion of the money borrowed was spent on a portion of these lands.

1911. For thorough drainage?—Yes.

1912. It empties itself into this drain?—Yes, the particular drain.

1913. But where is the outfall for that drain—your land is above Sir Erasmus Borrowes?—Yes, on the Dundavin side of it.

1914. Can you point out on the map where this large drain is?—The water of the river empties itself into the Green.

1915. Mr. Benjamin Jackson.—I appear on behalf of Major Borrowes, and I believe that portion of Ballymannon land drains itself into the Green, but the upper portion is emptied into the mill stream that supplies Tipperary at Ballymannon Mills.

1916. Mr. McGlashan.—I must say I don't think it does.

Mr. William  
Dunne.

Mr. William Dunne examined.

1917. Lord CAHILL.—Are you included in the scheme?—Yes, you will find my land mentioned on page 8 of the schedule for the Queen's County; No. 14 on the Ordnance map. Mrs. Gustina Beller is the head landholder.

1918. How do you hold?—Under a lease of 30 years.

1919. And you wish to give evidence as her tenant?—Yes; the townlands are Corrool, Derrybrook, Ballymannon, and Porteen. The probable increased value is put down at £107. I have been looking at the map—I only saw it to-day—and I observed that land is marked as flooded, and that can be improved—land coming up to the very door—land that has been drained, and is perfectly dry. The only fault I have to find with it is, that it is almost too dry.

1920. Is that in Ballymannon?—Yes, in Ballymannon. I don't see any land that can be improved in Corrool.

1921. Corrool is put down as partly flooded and partly injured?—Twenty-six acres flooded, I was just thinking where it could be. Why that amount is entirely out of the question, there might be half an acre. As to any land of mine that might be liable to flooding, I may tell you I have built a dam fully three or four feet high all along the river for three miles to keep in the water, and no water ever comes, or can come, over that, except through a net hole or a thing like that.

1922. Then you say that Corrool is practically not flooded at all?—I do.

1923. What about Derrybrook?—I left the dam out from the river bed, so there is a piece of land between the dam and the river bed which is flooded. The river is narrow there.

1924. What is the average of that?—About five acres altogether, but that is always meadow, and you know that flooded meadow land when it is not flooded at the wrong time, is greatly benefited by

flooding. I set that bit of land every year at, I suppose, from 24 to 25 an acre.

1925. Well, what about Ballymannon?—Some of Ballymannon is flooded. The Strudbally river comes in there. I have known the water come in over it once or twice, but the only damage which is done there is by the backwater from the drainage of the land. I have two drains into the river, and during flood some backwater comes up.

1926. Do you find it interferes with the drainage at all in winter—in a heavy flood is the outfall interfered with?—Not a bit. I have a good deal of land where, in the winter, the water comes up a foot over the sub-drains, but I have the main drain opened, so that I can always see the sluices working. I make it a point very often after a flood to look carefully after these, and the very moment the flood goes down, I can see the water pouring out of the sluices.

1927. In fact you think that Ballymannon is not damaged at all?—Not by floods.

1928. The injured portion seems to be very large; it is put down at 200 acres!—That comes on the Barrow. I am surrounded by three rivers: I have rivers all around me. Porteen of the land mentioned there is adjoining the Barrow. I have also a dam six feet high all round the Barrow portion, and in that dam I have sluices at the end of the outlet, that I can raise and lower as I require.

1929. In your opinion these 200 acres are practically not injured?—I would not say that; but I think that the improvement which it is calculated they will derive from the proposed scheme, is infinitely too much. At first I thought the whole of the probable improvement which any lands would derive, was put down at £49, but when I got this schedule I found it was £107.

1930. Do you believe that the present value of the

land to be drained in Ballynasson is given at £1381—Yes.

1931. Well, there is only £48 put down as the probable improved value of that?—Yes; but then look at Portree. The present value is put down at £62, and £38 is put down as the probable improvement. That is a very small townland.

1932. In Portree I see that there are sixty-five acres flooded, and forty-nine injured?—That is as the put I suffer most from.

1933. Well, referring again to Ballynasson, you are put down as having 209 acres injured—do you consider that amount is right?—No, or nothing like it. I would take sixty-two off it.

1934. Therefore the 200 ought to be diminished?—Oh, very much.

1935. Well, then, as to Portree?—Well, I think Portree is fair enough. I must say it is all damaged, but never flooded. It was one winter. Sometimes in a very big flood the water comes over my dam from the Barrow, which is now getting so choked up that in that part of the country there is no river at all. You can hardly see the river now. Rushes are growing right across it. It is a great big empty ditch.

1936. In Portree you think there is a fair amount of land included in the valuation?—I would not complain so much about it; I think it is fair.

1937. But in Conell and Derrybrook you say there are only five acres flooded?—Yes.

1938. And Ballynasson has not so large an area as set down?—Yes.

1939. Mr. CLARKE.—If the Barrow was choked up altogether would you be much damaged?—I would, for then I would not have an outfall. I would be damaged in this way. I can prevent any water coming in on me. If the river was choked up I could not let the water off. I have to keep the water that falls on my land, on my land during the flood. Then when the flood goes off I let it out through the sluices into the Barrow.

1940. Mr. BROWN.—Was that dam made many years ago?—It was made in my father's time. Of course it has always to be kept repaired and cleaned.

Mr. Alexander Duncan, examined.

Mr. Alexander Duncan.

1941. Lord CASTLEBROUGH.—Do you wish to give evidence?—Yes, as owner of Castle Reban farm, which is a little this side of Ballynasson. It is in the county Kildare, on the borders of the Queen's county.

1942. What is your landlord's name?—Captain Deane. In ordinary seasons there would be about eight acres flooded—the lower field, and it stops the drainage from the upper part.

1943. Are you owner of the whole of Castle Reban?—No, only part of it. I occupy about half of it—about 360 acres. The field I refer to, being the lower one, of course stops the drainage from the rest of the farm which goes in that direction, and, as Mr. Deane has properly stated, when the flood comes at certain seasons of the year it is beneficial, but when it comes at other seasons it is injurious to the land; but any great expense for remedying this would scarcely be warranted. I think, with Mr. Deane, that if you took away the sharp which is near my farm, and forced a pool, and removed the weir at Milltown a little below it, it would nearly answer all the purposes which persons living on the Barrow would require, and thus save a vast deal of expense.

1944. Does the whole of your property run along the river?—Part of it.

1945. You have no dam such as Mr. Deane mentioned?—No.

1946. His dam does not come down as far as you?—No.

1947. I suppose you would know your place on the map?—Yes. It is above Bert. I have looked at the map.

I have a man every day in the year at it. It would take a man always to be mending it.

1948. And keeping it in repair?—Yes, because the cattle burn it and walk it.

1949. That is a considerable expense which, of course, would be saved if the bed of the river were sunk?—Yes, but that is very different to paying £107 a year.

1950. But you admit that at present the Barrow does not give sufficient outfall to this tributary river, and that it is getting worse?—There is no doubt in the world the Barrow is getting worse every day. Less water makes a flood in the Barrow now than ever did before, and I have a long experience of it.

1951. But speaking generally of the district, which I am sure you know very well, would you consider the carrying out of the works proposed would be a benefit to the district?—I would, but I would say this—that if there was no weir at Athy, and if the very high sheep between Athy and the Kildare river was removed, I don't think there would be any necessity for doing anything to the Barrow. That would give a fall of eight or nine feet.

1952. That is, so far as you are concerned, at the outfall of the Sladallyn river?—Yes, and generally it would improve the river up to Portliffington if these impediments were taken away.

1953. And you think there is no impediment in the river between this sharp and Portliffington?—None. There is a very severe sharp at Bert. If the water was washed down from that we probably would find an impediment later, but that is such a large impediment now it supersedes all the others.

1954. Colonel CAMDEN.—I suppose a summer flood would injure your land?—It would if it could get on it, but it cannot get on it. I was once flooded in summer. That was in September, 1873. I never saw such a flood. An ordinary flood does not injure me a bit, except that it wets the land.

1955. Mr. FENNY.—Is there any other proprietor here who wishes to give evidence about the valuation?—(No response.)

1956. Have you looked at the valuation schedule?—I have not.

1957. 246 acres are put down as flooded. I suppose there is a great deal of your land flooded?—There is a field of 11 acres, and three-fourths of it is flooded at ordinary times, but when extraordinary floods come, as in 1879, of course the flooding goes further.

1958. There are 120 acres marked injured?—Well, injured so far as the stoppage of the drainage is concerned.

1959. But you think that is fairly accurate?—Well I think so. There would be in or about that much.

1960. Have you seen the proposed improved value put upon it?—I have not.

1961. I suppose it is hardly fair to ask you about it, for it possibly includes other lands?—The two farms are owned by one landlord.

1962. And there would be a decided improvement to the land in your opinion if the drainage were carried out?—I think you would improve it perhaps 5s. to 10s. an acre—not more than that.

1963. Sir JOHN McKESSER.—The Irish acre you meant?—Yes, the Irish acre.

1964. On this townland the valuator puts down the improvement of one portion of it—the flooded head—at 4s. 6d. an acre, and on another portion 5s. Of course we are not able to define which is poor. I suppose it is all the same quality of land?—The same quality.

July 26, 1864.  
Mr. Alexander  
Duncan.

1965. The improved valuation which Mr. Fitzgerald puts down is somewhat under what you say?—Yes.

1966. Therefore you don't think it too much?—I have not given any thought to the matter more than making the rough guess of from 5s. to 10s. an acre. Perhaps 5s. would be fair.

1967. No part of it is put down at more than 5s. Therefore the improvement assumed is correct?—I think so.

1968. The injured land which is not actually flooded but which borders the flooded land and is not, is put down at the improved value—part of it at 2s. 6d. an acre and part at 3s. an acre, and a third lot—the largest—at 3s. an acre also?—I think that would be about the thing.

1969. That is the statute acre?—That would be about one-third more.

1970. Mr. BRUCE.—When you say that the removal of the sharp at Bert and of the weir which in there would answer all the purposes of persons living in the Barrow, I presume you mean of persons living in your neighbourhood?—Yes. As far as my knowledge, which is not technical, would go, that interferes with the fall of the river, because the sharp there is very obstructive. Its removal would be a very simple matter, which would save the expense of an elaborate process that would stretch out for miles on either side and make the rates still more costly. We dread extra expenses being placed upon the lands—either our own or our neighbours. I have conversed with others who know more about these things than I do, and according to them and to my own limited knowledge, that would meet the whole case as far as I can see, of the Barrow and its drainage.

1971. You don't mean to tell us your opinion is that the removal of these two obstructions would be really all that would be necessary for the purposes of the towns of Portlavington and Moortown?—That I am not competent to say.

1972. You speak of just about your own neighbourhood?—Yes.

1973. Mr. SMITH.—The area put down here of the flooded land is 246 statute acres. Do you think your land, and that of the other tenants, would come up to

about that amount, that would be about 160 Irish acres between both of you?—Oh, dear, no; not at all. By flooded, do you mean with the water actually coming over it?

1974. Yes?—Oh, not the half of it. Between the two farms there might be 160 statute acres, the farms of which would be obstructed by the high floods.

1975. In winter the land would be flooded to a depth of about one foot?—There would be a seeping wetness of the land, but no actual water that you could see.

1976. You think it is quite a mistake to place 246 acres as actually flooded?—Yes.

1977. On the whole of that property?—Yes, on the two farms.

1978. There are only two farms on that property?—On the river side. There is another farm on the other side of the canal.

1979. But is the land on the other side of the river?—No, not on the other side of the river, but on the other side of the canal. The property stretches back to the canal. There is some behind which is of course not touched at all. It is high land in no way affected. No matter how wet the season there is a large portion of the farm not affected by flooding.

1980. Could that land on the other side be included in the 246 acres?—No. I don't see how that land could be linked with the other farms.

1981. Mr. BRUCE.—Have you examined the map?—I have only just glanced at it.

1982. Mr. SMITH.—You are satisfied with the rating put down for the improvement?—Yes. I think so, provided the expense is not too great.

1983. But that would make the large scheme perfect, and prevent the flooding of any land?—If that rate would pay for a large scheme I have no objection to pay that much on my holding, 2s. or 3s. an acre. Of course the larger the scheme the greater the area, but that is a matter for the engineers, and I am not competent to give an opinion about that, but if it were my own doing I would be quite satisfied with the removal of the impediments I speak of, and that it would answer all the purposes of the land about me, as far as we can see.

Mr. Benjamin  
Jackson.

Mr. Benjamin Jackson continued.

1984. Lord CASTLEMEYER.—When do you represent?—I appear on the part of Major Barrowes.

1985. Have you seen the map?—No, but I know the country perfectly well.

1986. You have got the valuation schedule?—There. 1987. Can you say whether the proper figure has been put down for the flooded lands?—I think not. I think the valuation is far too high.

1988. I mean the area. First of all take Carrigill Lower and Calverstown?—Major Barrowes has not land in Carrigill Lower. That must be a mistake. He has land in Carrigill Upper.

1989. Is that flooded land?—No, it is fifty feet above the streams.

1990. How big land in Calverstown?—He has.

1991. Is it rightly marked in the schedule, 6 acres flooded?—No, there is no land flooded in Calverstown, not a perch.

1992. Well, begin with Oldcourt, there are 385 acres put down as injured. Is that correct?—I believe that is about correct.

1993. As injured?—There are 181 acres turbary, not usable at all.

1994. And the rest?—There is part of the rest of it injured, but the larger proportion of it is dry, perfectly dry.

1995. Just run through the figures, and see if there is any one you wish to draw attention to as inaccurate, or are the whole inaccurate?—I think Major Barrowes would object to all except Oldcourt. He has laid out

a great deal of money of late years in draining Calverstown Lette, and there is an abundance of fall above the mills for the district.

1996. Then there are Mullaghmagne West, Crowsglass, and Martinstown?—I don't think the Barrow drainage would affect them in any way. They are too high above it.

1997. Are they injured lands?—They are injured lands more or less.

1998. Now, which of these lands are injured. In Mullaghmagne West there are 112 acres put down as injured, is that so?—Oh, nothing like what is put down there. There is a part injured, but not so much at all as that.

1999. How much?—About twenty acres.

2000. Well, in Crowsglass, how much is injured?—There are no injured lands in Crowsglass.

2001. And Martinstown?—There are some injured lands there.

2002. How much?—I don't think the acreage is very much. Major Barrowes has drained that, and there is no waste fall.

2003. Well, what about Ballyshannon?—I am getting land drained for him there at present.

2004. Now, come to Blackfield; seventy-two acres are put down as injured?—Yes, but there is no injured land in it.

2005. The next is the Wevill?—Oh, that is a very small place—four acres. It has been thoroughly drained.

2006. Carrigill! Lower—what about it?—Oh, the thirty-five acres put down there as flooded, are in the possession of Miss Kennedy. It is not Major Barrow's property.

2007. Well, as to the improved value—do you think that is fair?—No, I don't think it's value could be increased to the extent stated.

2008. What is the name of the tributary that runs through these lands?—It is the river which runs by Tipperan mill, which Sir Erasmus Barrow has been speaking of, and which is higher up in the stream.

2009. Is there anything else you wish to say about these lands?—Nothing more. I wish to ask, will the proprietors lying between Major Barrow's property, as Old Court and the Barrow, be compelled to open the stream to the Barrow? If not Major Barrow would derive no benefit whatever.

2010. Lord CASTLETOWN.—Of course, in a large drainage scheme, I suppose they would be; but that is a matter I cannot give any information upon—it is a legal question.

2011. Sir JOHN McKEARIE.—Nearly all the lands mentioned in the schedule are put down solely as injured—not flooded?—Yes, all but one item, and that does not belong to Major Barrow.

2012. Do you look upon it that these lands would not be benefited by the contemplated works?—I don't think they could receive any benefit whatever from them.

2013. None of them?—They lie too high above the Barrow at present.

2014. Have you got sufficient outfall?—Abundance.

2015. For thorough drainage?—Abundance of fall. I have been draining for Major Barrow for years past, and I find in Calverstown Letha, I could leave some twenty feet of fall behind me that I could have brought up if I required.

2016. Mr. BARRIS.—I see Calverstown demands in that schedule, and the owners are put down as Major Barrow, Miss Jane Fitzgerald, and Mr. Freeman. Have you anything to do with that land?—Major Barrow is the land landlord, and Miss Fitzgerald is the middle lady, and Francis Freeman is the tenant, so that any benefits to him would not come to Major Barrow.

2017. Colonel GARTON.—I see 181 acres of deep bog put down in reference to Old Court—are you able to cut to the bottom of that?—Yes, we are able to cut to the bottom of it with the present drainage, but not from free water. There is water lying in it, but we can take the turf to the bottom.

2018. Would not this drainage, if carried out, enable you to cut the turf better?—Oh, I think it would be an improvement to Old Court. That is the only portion that I refer to as capable of being improved by the drainage of the Barrow. There is no other portion of Major Barrow's property that could be benefited by the drainage of the Barrow, except Old Court.

Mr. Edward Jackson examined.

2019. Lord CASTLETOWN.—I understand you appear on behalf of Mr. Venechyle?—Yes.

2020. And that you can give us some valuable information as to the height of the floods?—Yes; I was asked about four years ago by Mr. Venechyle to go down to his property at Cloney, to examine it, and see if I would recommend any scheme of drainage. I recommended a certain project to him, the banking and deepening of the bog canal which he called my attention more particularly to. I pointed out to him that no scheme would be thoroughly efficacious, unless the Barrow was treated in this instance. I found that the flood water of the Barrow, at the mouth of this canal, extended its course nearly a mile and a half inland. The scale, as the crew said, is one mile from the river bank of the Barrow itself. I was also told that in the open reaches of this bogland, where the Nurney and Finery rivers were carried out by the drainage carried out by the Duke of Leinster, a great quantity of water was constantly brought into it and upon the land, there being no fall out of it to the Barrow, when the Barrow itself is high in flood. I took levels at the Barrow itself where it skirts his property for three miles and a half, or three miles three quarters. I took the levels of the banks also. I found the banks, in nearly every instance, were below the flood water mark, showing that the river floods are higher than they used to be.

2021. Mr. HARRARD.—Caused by the bed of the river having risen?—Partly by the river being silted up and partly by the drainage works being carried out in the upper reaches the water comes down more rapidly than before. In some places the banks were three feet below the water mark. There had been a flood shortly before and I was able to determine the height of the flood very accurately by the leaves and other things.

2022. What was the date of your examination?—In April, 1881.

2023. Lord CASTLETOWN.—You say the floods come down more rapidly. What would be the effect of that on the lower grounds below?—Of course the floods come down more rapidly, and being unable to get away would distribute themselves at a higher level than they did before.

2024. That is your opinion?—Certainly.

2025. Did you find any particular siltling up in the river?—In the district I examined there was a great many banks and obstructions. There was an additional obstruction—an old weir—which held the water up very considerably.

2026. Where about?—At Bort.

2027. Is that a temporary weir?—Oh, I think it is left there altogether.

2028. Mr. John Gilmore.—It is more for the purpose of the mill than as an old weir. It is a mill weir with an old weir attached.

2029. Sir JOHN McKEARIE (to Mr. Jackson).—The embankments you allude to—are they only connected with Mr. Venechyle's property?—Yes.

2030. And with them only?—Yes.

2031. And not with any others?—No.

2032. And you found them below this flood level?—I did, with the exception of one particular embankment of more recent construction.

2033. Mr. HARRARD.—Was that of any length?—No.

2034. Sir JOHN McKEARIE.—You say these embankments are of little avail?—Quite useless in a high flood.

2035. You have no knowledge of the value of the land?—No.

2036. But you did not recommend Mr. Venechyle to carry out any works unless the main river was improved?—I considered he would be almost helpless unless some project such as this was carried out.

2037. Mr. HARRARD.—Were there any sluices in the small embankment you saw?—I did not see any.

2038. Of course their effect would be to retain the water?—There were gaps made in them here and there for the tenants going in and out, and these had never been repaired.

2039. The banks were useless?—Useless.

2040. Your experience of the Rathangan and Nurney drainage scheme was that they brought down more water in flood time than before this drainage district was improved?—So I surmised.

2041. Was that the result of your observation?—No, from inquiries made. I was there only two days,

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July 26, 1884.  
Mr. Benjamin Jackson.

By Edward Jackson.

July 15, 1892

Mr. Edward  
Jackson

but from making inquiries in the district I came to that conclusion.

2042. Have you considered the effect of the proposed works in the same way at Athy and below it?—I have confined myself entirely to Mr. Verschoyle's property above Athy.

Mr. Robert  
Manning, C.E.

Mr. Robert Manning, C.E., further examined.

2045. Mr. Price.—I only wish to ask whether the whole of the Duke's weir is to be swept away or replaced by sluices?—The Duke's weir will have a number of sluices to enable the land to be relieved. The water of the Duke's weir will be maintained at the same level as at present, and a sufficient number of sluices will be placed in it, so as to control the floods above it.

2046. Then I wish to ask how for the excavations are to be carried out below the Duke's weir through Athy bridge, and Horse bridge, and whether these bridges would be removed or underpinned?—The dimensions of the channel from the Duke's weir down to the navigation weir below Athy are shown upon the sections in the published reports—the dimensions of the channel and the inclination of the water. It will be necessary to underpin Athy bridge and to change the Horse bridge. I don't know what the depth of the foundations at Athy bridge are now; but the bottom of the river under that bridge will be deeper than it is now if the works are executed.

2047. And will the Horse bridge be widened or changed in form, for it appears, as it is at present, to be a very great obstruction to the water. It seems as if it would be pretty well under pinned. Will there be a new bridge entirely?—At the Horse bridge such a structure must be placed instead of it as will accommodate the traffic above it, and the river under it.

2048. Is Ardree weir to be done away with?—The Ardree weir is below the junction of the navigation. It is obvious that the water must be there maintained at the same level as at present with a sufficient number of sluices to pass the floods through, so as not to throw the back water on the Duke's weir.

2049. There is one other matter, but, I suppose, it will hardly affect the question. Mr. Harman has excelled the right of catching eels there, and derives a very considerable profit. Of course, there may be accommodation work by which he might continue that, or is it to be bought out?—I did not consider that question at all; but if there be a legalized eel fishery below the Duke's weir, there is no reason why it should not be continued in the improved state of the river.

2050. Might I ask whether Mr. Harman's water power would be maintained for his mill?—Mr. Harman's water power, so far as the drainage is concerned, is evenly maintained at the Duke's weir, and there all the duties of the Drainage Commission end. As to his mill we have nothing to say to it. His height of water will remain undisturbed.

2051. And if the sluices are opened they would, I take it, only be opened in flood times so as not to interfere with the height of his water in summer time?—That is the obvious consequence of what I have

2043. Mr. James Price, C.E.—On behalf of Mr. Henry Harman, of Athy, miller, I wish to ask a few questions as to the nature of the works proposed.

2044. Lord Castletown.—Mr. Manning will kindly answer these questions.

before said, that the summer water level will be maintained at the Duke's weir as it is at present.

2052. Mr. Bacon.—Then your answer refers only to the summer water, not to the flood level?—Not to the flood level which is injurious to mills.

2053. Mr. Price.—When the sluices are opened during floods the height of the water from Mr. Harman's mill would be lowered. As a general rule the opening of a sluice will lessen the height of the water above it; but I desire to know whether the sluices could be of such large dimensions as to be able to carry away the flood at the low level upon the present crest of the weir?—It would be improper to lower the water above Mr. Harman's weir or the Duke's weir below the present crest of the weir which is his property. There is no necessity for it.

2054. At any time?—At any time.

2055. Mr. Bacon.—In these two or three replies, Mr. Manning, you say that the summer level is to be maintained by means of sluices. I think you further said, or at least you did not say, as to the winter level, how you propose to deal with the flood by means of these sluices. Do you anticipate that the sluices you are going to put into the Duke's weir will relieve the river above that point—the flood water—so as to keep the flood level down to the point which your plans portray?—Yes.

2056. Mr. David Bellamy.—I appear for Messrs. Wright and Walsh who are wrongly described in the schedule as Messrs. Tylden and Walsh. In page 3 of the schedule for the County Kilbuck you find the lands mentioned. I want to know what is to be done with the mill—how is to be disposed of—and what provision is intended to be made with respect to the eel fishery which is a very important matter in this case.

2057. Mr. Manning.—The water power of the Bert mill must be entirely destroyed and purchased. With regard to the eel weir, if there be a legal eel weir there, it can be constructed again, but that will be a matter for decision before a competent court of arbitration as to the tenant's rights, but you may take it that if the Barrow scheme goes on the water power of Bert will be completely destroyed.

2058. Lord Castletown.—Then it becomes practically a legal question as to the wishes of the people and the valuation.

2059. Mr. Bellamy.—The question of value I am not prepared to deal with at present, but I observe Mr. St. John here. He is chiefly interested as that portion of the property, and perhaps he would be willing to give his evidence.

2060. Lord Castletown.—I have asked several times if any one can give evidence as to valuation.

Mr. Thomas  
St. George

Mr. Thomas St. George examined.

2061. Lord Castletown.—Can you give us some information about this property?—There is very little or any lands injured, except the bounds by flooding; and the lands would not be benefited very much by drainage.

2062. Can you give us any information about the value?—I am not competent to give you any information with regard to the value. Only a small portion of the lands are actually affected; about ten acres, five of which are flooded, and the remainder injured.

2063. Is the area correct: there are twenty-three acres in all. How much of Lord Seaton's is included in that?—(No answer.)

2064. Mr. Bellamy.—I was over the lower portion of that land to-day, and a tenant's brother informed me it is very little injured, and that such a season as this almost compensates them for the loss of the grazing in the winter.

2065. Lord Castletown.—They don't think they are much injured in any way?—Yes.

2055. That is those on the estate of Messrs. Wright and Walsh?—Yes.

2057. Mr. St. George.—Part of the flooded land I hold at present, and it pays me two and sixpence an acre.

2058. If it was drained how much would it be worth?—I am not competent to say.

2059. Mr. Jefferys.—How much of your land is flooded?—Between five and seven Irish acres. In my experience in winter there never has been less than five acres, and there never could be more than ten. There is I think, about eight feet that runs along the brow of the river, keeping it very much off from the rest of the land that I hold, so that the land is never flooded higher than that.

Dr. James Kilbride, of Athy, examined.

2073. Lord CASTLEBROUGH.—Will you state your opinion as to the sanitary condition of this town?—I am sanitary officer of this district for eight years. My district extends seven miles up the river, and five miles down the river in the Cordow direction. Part of my district is most unhealthy. The part which runs up the river in the direction of Monasterevan is extremely unhealthy. The diseases prevalent are chronic rheumatism, diphtheria, and typhoid fever, and I am of opinion that these diseases are owing in a great measure to the condition of the lands, on account of the flooding of the Barrow. There is a very large portion of that district which is permanently under water. Even in summer, except a very dry summer like this, the cabins never become dry. Even this very hot weather there is a dank smell in all the cabins in the back part of my district. In reference to the town itself, for three or four years during very wet seasons, there was a portion of the town, the low lying portion of the town, flooded for a fortnight or three weeks. At that time the water rose in the cabins to a height of several feet. In one year the people in a portion of the town called Rathsteadward, had to leave their houses altogether.

2075. Was that last year?—No, two or three years ago, I think. The sewages of the town cannot be carried out effectively, owing to the fact that the high side of the water flashes back the sewage matter, and the soil and the pumps have become impregnated in a great measure by that means. It is quite evident that after those high floods here, those diseases I have mentioned should become almost epidemic. I have not the slightest doubt about that—that it is owing to the state of the town, caused by the floods and sodden condition of the lands, even in summer time. I have noticed that many persons have been obliged to leave their houses, even gentlemen living in the vicinity of the town have been obliged to leave their residences. I know at present one gentleman leaving his house on account of its unhealthy condition. That is brought on by the miasma air brought up from the low-lying land between his house and the river. In this very hot weather, in the evenings and mornings, it is quite disagreeable to pass up that portion of the river.

2076. Is that owing to the miasma?—Yes, it has also an effect on the back portion of my district. There are a number of people permanently lamed by disease themselves. It is called "log lameness," but it is a chronic rheumatism of a very violent character. They are young people, and they will never get better as long as they live in the locality. There is another disease—lung disease—in that portion of the district. It is very prevalent, and I think it is due very much to the condition of the land surrounding being so sodden all the year round. There is no doubt also, that if the river were drained or lowered, the surrounding land could be made dry, and that this part of the country would certainly become much more healthy than it is at present. I am of opinion

2070. What is your opinion as to the approximate value of the oil fishery?—Oh, the fishery ranged from £33 last year up to £120 a year.

2071. Last year was small in consequence of the extraordinary drought?—Yes. There has been an exceptionally good season, and the remainder of an average.

2072. Sir JOHN McKESSON.—Nothing about the weir or fishery appears in the schedule at all, and if the works are proceeded with, that will be a matter for compensation. If an arrangement cannot be effected between the parties satisfactorily, then of course it will be left to arbitration to see what the proper compensation is.

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Mr. Thomas  
St. George.

Dr. James  
Kilbride.

that if the river were lowered, the air of this locality in my district would be much improved, and that the health of the population generally would be much better than it is now.

2075. Sir JOHN McKESSON.—Do you think the injurious exhalations extend beyond the flooded lands in the district?—Oh, certainly.

2077. To what distance?—It would all depend on the part of the district you would ask me about.

2078. The part you have been refusing to from Athy up?—I think for a distance of from three to five miles from the river in that part of the district, and between here and Monasterevan. I am of opinion that that influence would be felt at that distance from the river.

2079. Your personal experience would lead you to say so?—Yes. There is a large tributary coming into the Barrow five miles off called the Bog river, and that portion of my district is more flooded by the Bog river than by the Barrow.

2080. And I suppose there are wet mists prevailing?—Yes, on both sides of the town here.

2081. And do these mists extend beyond the actual limits of the flooded lands that cause the malarious influence?—Yes. If you would walk down about nine o'clock on either side of the river bank you will find that the air is very damp and fetid.

2082. Is the drainage of the whole town affected by the river?—Practically it is.

2083. And consequently the drainage of the town cannot be carried out?—No.

2084. How is the town supplied with water?—With pumps lying near the river, and they are affected by the sewage being flushed back along the sewers when the river gets high.

2085. Is the town supplied by wells?—Wells and pumps.

2086. Are the wells affected at all by the sewerage?—They are.

2087. Does that extend over the whole of the town?—No; there are some portions of the town—the very high portions—not affected in that way.

2088. You think the health of the locality would be improved by the drainage being carried out?—There is not the slightest doubt about it.

2089. Do you think the inhabitants would be disposed to pay a small rate for the improvement?—I have not the slightest doubt but they would.

2090. Mr. BAILEY.—Are you aware that the drainage works as at present proposed end at Athy?—Yes.

2091. And in the opinion of some the effect of these drainage works extending up the river for 160 miles or so would be to send down a very much larger increase of floods at flood times?—Yes.

2092. Is it your opinion under these circumstances, and supposing nothing more is done, that the health of the town would be rather prejudicial than otherwise by the drainage?—Of course, if the drainage did not affect the sewers and lowering the bed of the river,

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Dr. James  
Richards.

I could not say it would be the slightest advantage, in a sanitary point of view, to the town.

2063. The drainage works as at present proposed don't offer to lower the bed of the river below Athy—only above Athy?—I think it goes down to Andree, which is considerably below Athy. I heard one gentleman here to-day giving evidence about Andree weir, which is a quarter of a mile below the town, and Mr. Manning gave evidence about underpinning the Horse bridge, and putting stones in Andree weir itself. That is practically a deepening of the river?

2064. Putting aside the Andree weir, you are aware that it is not proposed to deal with the bed of the river below Athy, and under that supposition do you think that the drainage of the town would be improved by the drainage works which are to be carried into effect above the town?—If the effect of the drainage works would be to lower the level of the water, at course it would affect the sewers of the town, even though the bed was not lowered. It would be all the same if the level of the water was lowered by the same works. It would accomplish the same object as if the bed of the river was lowered.

2065. Do you think yourself that the level of the water would be lowered unless the bed of the river is treated below Athy?—The river is placed immediately below the town is six or eight feet deep, and if this was a couple of feet as a lower level as the effect of the drainage it would be quite sufficient to regulate the sewerage of the town.

2066. But, unless it was lowered a couple of feet?—Well, it would require to be lowered a couple of feet, certainly—at the very least.

2067. And do you think the lowering of two feet would be sufficient?—The more the better—but two feet would be the very smallest depth, I am certain, that would relieve the sewerage of the town at the present time. One of the main sewers opens into the back drain and empties itself there. Then it continues for two miles. It would take two feet to lower the level to relieve that back drain.

2068. Two feet at flood time?—No, even at summer level.

2069. You think a lowering of the summer level two feet would be necessary to improve the sanitary condition of the town?—Yes, as a minimum.

2106. In flood time what would you say?—I could not say, for the flood time frightfully here.

2101. Mr. Burns.—Would it be your opinion that if the floods and fogs were removed the improved state of things would have an effect upon the poor rates, by reason of the fact that you would have less people in hospital?—Yes, there is not the slightest doubt of that. There are a number of poor people at present completely disabled, owing to chronic rheumatism, and if the circumstances around these poor people were removed of course the rates would be relieved of the responsibility of keeping these poor people, as they are obliged to do at the present time.

2103. Lord CASTLETOWN.—You mentioned the worst epidemics. Have you ever found that there have been epidemics here?—Typhoid fever is endemic here.

2108. And diphtheria?—It is endemic in the district, but it has not become epidemic; since I have come here chronic rheumatism is always here.

2104. Is it a severe or only a moderate type of typhoid fever that exists?—Oh, very virulent.

2105. And generally the sanitary condition of the town is very bad?—Yes.

2106. Mainly owing to the river?—Yes.

2107. Has it often occurred that people have been obliged to leave their houses?—For three consecutive years.

2108. What portion of the town is that in?—Both streets—on the Monasterstown side—along the edge of the river.

2109. Do you find, as a rule, as you leave the valley of the Barrow—and you proceed in your district outside that valley, that these diseases you have spoken of disappear?—Yes, this class of disease is almost unknown except in solitary instances—where you may have unsanitary conditions existing in the most sanitary part of the country.

2110. Sir JOHN McKEILL.—Is your district above or below Bert bridge?—Most of my district is below Bert bridge.

2111. (To Mr. Manning).—Is it intended to remove the accumulated mass of matter which exists in the river there downwards?

2112. Mr. Manning.—It is intended to continue the river channel at the same section above and below, 160 feet.

2113. You intend to underpin the bridge and excavate the channel below?

2114. Mr. Manning.—Certainly.

2115. Lord CASTLETOWN.—What is the depth at Bert?

2116. Mr. Manning.—The depth of the channel—below the proposed flood line, will be 9 feet 6 inches, and below the bridge it will be about the level of the canal or something less.

2117. Sir JOHN McKEILL.—There are obstructions in the river which keep up the height of the water above the bridge and below it?—Yes.

2119. If these are removed won't that lower the surface of the water?—That will lower the surface of the water—the minimum being the level of the canal.

2121. How much would that lower it?—That is a variable quantity.

2122. I mean within range of the drains of the town?—I could not tell that.

2123. Lord CASTLETOWN.—Will the proposed drainage works give sufficient outlet for the drain of the town?—That I could not tell without examining it.

2124. Mr. HARRISON.—The summer water between the two weirs will remain the same as at present?—The same as at present.

2125. Lord CASTLETOWN (to Dr. Richards).—You think the drain will require a fall of 2 feet.

2126. Dr. Richards.—Yes, that at least, for at the summer level it is flushed back at present.

2127. Mr. Manning.—There is no reason why the sewers of the town might not be conveyed below the level of the canal—that is, under the river itself by a culvert.

2128. Mr. Burns.—Does not the sewerage of the town now empty itself into the back drain?

2129. Dr. Richards.—Some of it only—our main sewer.

2130. Lord CASTLETOWN.—And the rest into the river?—Yes.

Mr. Manning.—It would be feasible to bring the sewerage down below the navigation weir level, and then give two feet fall for summer.

Dr. Patrick Laurence O'Neill, Athy, examined.

2131. Lord CASTLETOWN.—Will you kindly state what you know about the condition of this town and district?—I am officer of the Union Hospital here, and I have considered it my duty in order that I might give some information to this Commission to look up the books in connection with the Union. We treat two kinds of disease there—acute and chronic diseases.

I find that the majority of people suffering from chronic diseases, such as chronic rheumatism, chronic heart disease, and chronic effusion on the chest, live somewhere in the vicinity of the Barrow or on some lands that are greatly influenced by the floods produced by the Barrow. I have had six or seven cases of heart disease—some of them are at present in the hospital—

Dr. Patrick  
Laurence  
O'Neill

chronic diseases that arise, I was certain, from rheumatism produced not so much at the time of the floods but by the malaria that came on when the floods were disappearing and under the influence of the sun upon the wet surface. I have no doubt at all about that. Some cases of fever have been sent into the fever hospital at the same time from different parts between Ighite and Monasteroven. From the district of Monasteroven the cases sent into hospital were not typhoid fever. It was malarious fever.

2132. A distinct type from typhoid fever?—Yes. It looks like typhoid fever at first, but having seen the cases for some days I came to the conclusion it was not typhoid fever but malarious fever.

2133. Distinct malarious fever?—Distinct malarious fever, and on the whole I made up my mind that if the people living in the vicinity of the Barrow were under the same sanitary conditions as the people outside its influence, I would not have nearly so many patients to attend to in the hospital as I have at present, and as I have had for the last three or four years.

2134. Have the number of cases increased?—The number of cases this year has increased. I have seen very few cases of genuine typhoid fever, but I have had several cases of malarious fever.

Mr. Percy Le Tozack, Chairman of the Barrow Navigation Company, examined.

2135. Lord Castletown.—Will you make a statement first and then go into evidence?—I will make a statement first and then give you the opinion that our directors have formed of the proposed scheme from what they have heard and read about it. Then Mr. Mitchell and Mr. Keating and Mr. Webster, our agents, who are well acquainted with the navigable part of the river, will be very happy to answer any questions as to the part of the river we carry over. I would, in the first place, wish to remove any impression that may exist that the Barrow Navigation Company is necessarily opposed to a scheme for the drainage of the upper part of the Barrow. We are, as well aware as any one can be, of the great importance this drainage would be to the people whose lands are subject to floods, and if any complete scheme was brought forward—any scheme that made due provision for the interests of our shareholders for whom we always must stand in the light of trustees, we should be happy to further it by any means in our power. But this scheme does not appear to us at all complete as far as we can judge. Of course, we are in the somewhat difficult position of being called upon to estimate a scheme the full details of which we have not had in our possession. It was only this morning I saw the full report of Mr. Manning, the engineer, but we have had two documents in our possession for some time from which we have been able to form some sort of an opinion as to what effect these works would have on the navigation if carried out. These documents are the preliminary report of Mr. Manning, furnished to the House of Commons in August, 1884, and also a copy of the evidence Mr. Manning gave before the Commission, on the 24th and 25th June last, which Mr. Percy kindly forwarded to me. As regards the preliminary report as soon as we received it, we submitted it to the eminent engineer, Mr. Mulvany, who has had the advantage of an intimate acquaintance with the river Barrow, and we asked him to favour us with any observations he might wish to make upon it. He shortly afterwards furnished us with a report from which it appears, that while generally accepting Mr. Manning's calculations he drew from them very different deductions to those formed by that gentleman. There appears to have been a misprint in the preliminary report that misled us to begin with. It describes the area drained by the Barrow, to be 140,000 acres, whereas, in reality of course, it ought to be 750,000. In the preliminary report which was furnished to me, Mr. Manning

2135. Sir JOHN McKEELIE.—If the lands which you have been referring to as producing malarious fever were relieved from being flooded and from giving out these exhalations, that would improve the health of the district?—Not a doubt of that; it would be the most healthy under the sun, for it is entirely a peaty district—the most wholesome ground in the whole district if the floods were prevented.

2136. And would not that have some influence on the poor-rates?—It would lessen the poor-rates by half so far as the district over which I preside was concerned.

2137. Lord Castletown.—Do you think the district generally—from your knowledge of the people in the district and especially in the town, would be inclined to have a small rate being placed on them for the convenience of having the river lowered, and the disagreeable state of things removed?—If the rate was comparable I don't think there would be any objection.

2138. If it was a moderate charge?—Yes, if it was a moderate charge.

Lord Castletown.—The Commission will now go into the case of the Barrow Navigation Company.

speaks of draining a district the area of which is 1,185 square miles, containing 140,000 acres, but Mr. Mulvany informs me that there are 750,000 acres in 1,185 square miles. The Barrow drainage scheme appears only to apply to 637 square miles of the area containing 407,380 acres, and as Mr. Manning in his evidence before you accepts these latter figures, I have little doubt that the statement, that 1,185 square miles contain 140,000 acres, is merely a clerical error. Mr. Manning estimates the quantity of water to be discharged at Athy in a winter flood as 400,000 cubic feet per minute, but Mr. Mulvany says, that Mr. Forzythe, C.E., late engineer of the Board of Works, in his report on the Rotham River drainage estimated the discharge of water as  $1\frac{1}{2}$  cubic feet per minute per acre, which would raise the total quantity of water passing this town to 500,530 cubic feet per acre per minute.

2140. Mr. Manning.—Have you got Mr. Forzythe's report?—No, but it is contained in the report which Mr. Mulvany sent to me. Then Mr. Mulvany proceeds to say, that, accepting Mr. Manning's figures, 400,000 cubic feet, it would require a weir 1,000 feet long with 18 inches depth of water upon it to discharge this amount of water. Now I have a list of the weirs on our navigation, twenty-two in number, by which it appears that only two of these are more than 1,000 feet in length. The first weir at Ardara is 350 feet in length, the one at Carlow is only 487 feet in length, while the one at Beaufield, which is between Athy and Carlow, is only 120 feet.

2141. Is that irrespective of the sluices at Carlow?—There are no sluices at Carlow.

2142. I think these are?—There is one sluice since there—a sluice that can be opened for the purpose of lessening the great pressure there due to the weir, but at any rate the weir at Beaufield is only 120 feet long. Besides the 400,000 cubic feet of water per minute, which Mr. Manning estimates to be discharged over the weir at Athy, you must remember that the contents of the rivers Lerr and Grease empty themselves into the Barrow above Beaufield, consequently there would be a considerable increase in the quantity of water falling over that weir than there would be falling over the one here at Athy. There are, as I say, twenty-two weirs on the navigation, and only two of these are over 1,000 feet in length. Besides these rivers, Lerr and Grease, which I have mentioned, there are other very considerable rivers—the Burren and the Blir, and the Daghlan, and all add their

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Dr. Patrick  
Lawrence  
O'Sell.

Mr. Percy  
Le Tozack.

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Mr. Perry  
La Touche.

writers to those of the Barrow, and consequently would add their pressure to the lower part of the navigation. Mr. Milway considers his report in a measure which shows that he differs very much from Mr. Manning whom the latter gentleman states that he does not consider the present drainage scheme would have any injurious effect upon the navigation. He says—

"From recollections and aided by the Ordnance maps, very many of the wharves in the navigation are far short of 1,000 feet in length and one half of them are only from 400 to 600 feet in length. In the present state of the navigation there were serious delays to the traffic in the early part of last year, caused by floods. What then would be the state of things if all the large tributaries to the river Barrow above Athy were improved by the drainage operations contemplated? The drainage of the Rathangan river increased these floods, yet its main basin is only one sixth part of the whole main basin above Athy, viz. 637 square miles. One can only conjecture the damage and loss that might occur along the line of the navigation by floods if the drainage operations terminated at Athy. The whole subject should be taken up under the Acts for the Improvement of Drainage and Navigation, or a special Act. If the navigation is to be continued, very much must be provided for the passage of the flood-water without causing delay to the traffic, injury to property or increasing the expense of the carriage of boats coming up the river."

This scheme does not contain any provision to carry off the flood water or prevent its from being very seriously delayed or interfered with in our traffic. He continues—

"A strong representation of these results arising from the termination of the proposed drainage works at Athy, should without delay be made to the Treasury in order that in a Royal Commission to enquire into the drainage of the Barrow, the interests of the navigation should be considered. I believe it would be illegal to stop the work at Athy and resume the navigation in floods. The Glenties, Lerr, Barrow, Douglas, and Bertha rivers, flow into it below Athy, besides several minor streams."

Then the other paper on which we can form an opinion of the effect on our navigation is the copy of the minutes of the evidence given by Mr. Manning. Though of course I cannot attempt to criticise his calculations, at the same time I think I am justified in forming an opinion upon them and stating that opinion although it may not be altogether in accordance with his scientific calculations. In the commencement of his evidence after describing the area to be drained, and estimating the amount of water at 400,000 cubic feet per minute—he proceeds to quote other large drainage works which have been executed in Ireland as authorities upon which he has based his calculations apparently and on which he has founded the opinion that the drainage of the upper portion of the Barrow valley is not likely to increase the flooding in this lower. It certainly appears to me that experiments which may apply to the rivers Shannon and Bann, cannot with any fairness be made applicable to the river Barrow. The Shannon is furnished with large natural lakes, which form vast reservoirs covering an area of 80,000 acres, and the Bann is furnished with one large reservoir—Lough Neagh, which covers an area of 100,000 acres. Mr. Manning speaks of Lough Neagh, the reservoir of the Bann, in these words—

"That is a reservoir which can control floods in an extent of country twelve times its size, discharging water into it. I found on that day that the lake rose four inches, which represented a discharge of eight tenths of a cubic foot per minute, so that if the lake had not exercised a compensating power, instead of having between half and eight tenths of a cubic foot per minute, you would have nearly one and a half foot per acre per minute from that large district."

That shows the value that Mr. Manning puts on a compensating reservoir as regulating and controlling the discharge of floods, and the only equivalent for such a reservoir possessed by the river Barrow is the large low-lying district above this town which is liable to be covered with floods and which Mr. Brown de-

scribed as resembling an immense mill pond holding the water in its reservoir and discharging it gradually, and this is the district proposed to be drained. It is evident that this district does discharge the duty of reservoir for the river Barrow, because at the time that Messrs. Kane and Fitzgibbon went to value those lands, in August, 1883, they were unable to do so, owing to the lands being covered with water, and in altogether too flooded a state to enter upon them. At the same time, by record which we have kept of the height of the water in the Barrow, we find that there was no serious flood in the river, in August, 1883. The average depth of the water at the lower mill of Carlow look in that month was seven feet seven inches—a little higher than the usual average for that month, but not such a flood as to interfere in the slightest way with our traffic or navigation. Mr. Manning then proceeds to say, concerning this navigation—

"I know that apprehensions have been entertained that this immense quantity of water that will be sent down will drown them. I do not wonder in these apprehensions. It is obvious that it is not the quantity of water that injures the navigation, but it is the velocity with which the water is sent past the navigation."

That is a subject on which we must differ from him entirely. Of course, the increased velocity of the water would put our company to the great additional expense and the inconvenience of having to employ extra haulage power; but on the other hand, the sending down of this immense volume of water would submerge our track line, would flow, over our track gates, and render the carrying on of our traffic entirely impossible, consequently, we consider that the volume of water is calculated to do us infinitely more harm than the velocity. Further on Mr. Manning says, in reply to a question from Mr. Brown, that at present it takes from a fortnight to three weeks for the rainfall from the upper district to be discharged at Athy, and then he says that by the improved channel, the water, supposing it travels at the rate of four miles an hour for forty-seven miles, which is, I believe, the length of the improved river—that this amount of water will come down in from thirteen to twenty hours. Certainly it seems to us a very serious matter that water which used formerly to take from a fortnight to three weeks to come down, should be precipitated down into our navigation in so short a time as thirteen or twenty hours.

2143. LORD CASTLEMEW.—What is the effect of the Rathangan drainage. Has it had any effect as you at all?—Oh yes, we consider it has had an effect in hastening the floods down to the navigable part of the river. It has not had any very serious effect upon us because, as far as I could gather, the water coming down out of the Rathangan river drainage spreads itself out in the neighbourhood of Monaster-eves.

2144. In point of fact is not by the compensating reservoir you spoke of, and comes down slowly after that?—Yes. You see the Rathangan river discharges itself, before it was drained, was also a compensating reservoir for the river. The Rathangan drainage has reduced the size of our reservoir, and consequently has rather increased the velocity of the floods, or rather hastened them. Mr. Manning says—"You will find if you drain the Barrow you will have higher water in the Barrow often than now." On this point we do agree with him fully. We expect we will. Then there is another point on which the present drainage scheme appears to be fraught with much danger to my company, and that is the question with regard to the accumulation of silt forming in the river. I read in the copy of the evidence given before you at Feterborough that the people of that district stated that the river had silted up very much there of late years, one witness stating that people could walk dryshod across the river, where a few years ago there was a depth of five feet of water. Mr. Manning observed,

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In reply to Mr. Cassidy, that by regulating the velocity of the water in the new channel of the river, and by the evensness of the bed of the stream, the accumulation of silt therein would be prevented. That is probably the case. Where, of course, the gradient of inclination is not very irregular, and the velocity is somewhat rapid, the silt would not accumulate; but on the other hand, as soon as it came down to our part of the river, where the current is stopped by our works, and where our works imposed the waters of the river, we have every reason to believe that this silt would form very formidable deposits, and probably fill up our canals, and if it came down in a heavy flood and lay against the back of our lock gates, it might entirely put a stop to our navigation until we could dredge away that amount of sand. The silt at present appears to lodge in the upper reaches of the river, and not to come down to us to any appreciable extent. There is no doubt when the works you propose are cut through land of the nature of the upper portion of the Barrow, the Barrow will silt up from time to time. I have heard it stated, and Mr. Manning acknowledged that these were always, more or less, trouble with the banks of drains whatever the section of them might be, and we can only conjecture that when any large slip in a bank of the river occurred, or the sides of one of its annually cleaned out tributaries fell in, that this mass of earth would be carried along the paved bed of the river, along the improved bed of the channel until it came into comparatively still water where it might form a very serious impediment to our navigation. These appear to be the principal dangers to which our navigation will be exposed by the stoppage of these works at Athy, that is to say, the filling up of the channel by silt, and the increased flood, which would be likely to carry away our weirs and break down our embankments. Or even if they covered our track bars, they would entirely prevent our carrying on our navigation. Mr. Manning, I observed, acknowledged, in reply to the chairman, that he had made an examination of the river below Athy, in fact, that no means had been taken to find out whether the outlet of this proposed discharge was sufficiently large to carry off the immense body of water they were going to send down. Even at present the carrying capacity of the river appears to be fully taxed after a long continued rainfall, or two rainfalls following one another at very close intervals. The effect of the first one is, to fill up our reservoir, and that of the next one is to altogether overflow. In such a case we are subject to very considerable floods as it is. Mr. Manning acknowledges the value of this compensating reservoir on the river Barrow, but at the same time he expresses the opinion that the destruction of such an obstruction, or reservoir in the Barrow, will be followed by the more regular and even passage of the rainfall. I don't see myself how this can be so, and I notice that in the minutes of evidence Lord Castlereagh speaks of some drainage works in this district, and says—

"I believe the work has been successful in draining the upper portion of the district, but it has left the lower portions in such a way that the land has been impoverished by want of water. The river is weak to fifteen ft. and in summer time it is nothing but a stagnant ditch, while in the winter time a heavy volume of water comes down, and floods the low-lying lands below the drainage district. This has caused and will cause a good deal of complaint on the lower waters of the Nore, and will probably involve another enquiry such as this."

He then proceeds to ask Mr. Manning how he can reconcile that with his opinion that the waterflow of the Barrow will be more regular than before, and Mr. Manning says he will have to go into an abstract matter, and refer to the Gauges and Mississippi in support of his argument. I think matters referring to the river Nore in the Queen's County are more likely to be guides to us than matters connected with rivers either in America or India. These are the

remarks I have to make with regard to this scheme as it affects our navigation—a navigation which is one of considerable age and of considerable utility to a considerable number of people who carry on business along the banks of the river. Our navigation was formed in 1791, at which time we were granted a Royal Charter, and we expended £120,000 in the formation of ten miles of canals, the erection of twenty-two weirs and twenty-two locks, in dredging the river in certain places, and altogether making the navigation what you see it now. It was then prepared to carry off the floods of the river as it existed at that time, and it is impossible for us to say whether these works erected so long ago as 1791 (many of them) are capable of bearing the increased strain put upon them by this very large discharge of water which Mr. Manning proposes to send down upon us. There is a very considerable amount of traffic upon the last year. Last year it amounted to \$1,000 tons, and there is no doubt if any interruption were caused to the traffic it would be the greatest possible inconvenience to a number of merchants and tradesmen who depend on it as the means of getting their supplies—either forwarding their manufactures to foreign countries or procuring the raw material to manufacture in the various mills and mangle-houses which exist along the river. Consequently, gentlemen, I hope that you will consider, before you recommend any such scheme, that the interests of the Barrow Navigation Company should be fully considered in the matter. I think that is about all I have to say.

2145. Lord Castlereagh.—I think it would be well if you asked Mr. Manning one or two questions. I also want to know whether you object to handing in Mr. Mulvany's report?—Certainly not. I shall be very happy to put in Mr. Mulvany's report.\* I am ready to answer any questions put by the Commissioners.

2146. Sir JOHN McKEEL.—As I understand, the opinion of your engineer is, that the discharge of water in floods has not been sufficiently provided for by Mr. Manning?—Yes, and that there has been no provision made at all for our navigation.

2147. The quantity of water to be discharged I mean. You stated that the quantity provided for by Mr. Manning, 400,000 cubic feet per minute, is insufficient—that that is Mr. Mulvany's opinion?—Mr. Mulvany states that that was Mr. Forryth's opinion in dealing with the Rathangan drainage. Mr. Mulvany himself is willing to accept Mr. Manning's calculation of 400,000 cubic feet, or rather less than one foot per acre, for the sake of demonstrating that even such an amount as that would be likely to cause no injury. I am not prepared to say that Mr. Mulvany does not consider that provision ought not to be made for 500,000 cubic feet.

2148. Mr. HARRIS.—The flood of '79 was a very exceptional one, I believe. The flow of water was greater than that at any other time?—We don't appear to have any record of any severe flood in '79.

2149. It was an exceptionally high flood. In September, '73, there was a very high flood in Carlow?—In August, '73, there was a rise of three feet seven inches at Ballyellen lock, that is below Carlow.

2150. The flood I speak of was very general all over Ireland, and I know that in the Barrow it was a very exceptional flood?—Yes, certainly. In September, '73, with the exception of February, '83, the water stood higher at Carlow lock than at any other time.

2151. It is on that rare occasion you had the great flood I speak of?—Both in January and February, '83, we had higher floods.

2152. But I am speaking of the September flood. Have you any record of the quantity of water that was passing Carlow at that time?—No. We have no means of taking the quantity. Some goes through the lochs and some over the weir.

2153. Well, I have made some calculations at Carlow of that flood. There were 354,400 cubic feet per minute passing through at Carlow weir—or at the

\* Observations on Report of Mr. Robert Manning, &c.

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Le Touche.

rate of 1.10 cubic feet per acre per minute. At Achy the same day there were 426,055 cubic feet per minute, which would make 1.11 to the acre as nearly as possible. Well, taking the drainage at Carlow at 600,000 acres, it gives 1.10 cubic feet per acre, and at Achy the same day there were 426,055 cubic feet per minute. That is equal to 1.11 cubic feet per acre per minute, which agrees almost exactly with my Carlow experience. But Mr. Manning's estimate is something under one cubic foot per acre per minute.

2154. In round number 1, but the difference is not very large. Of course you are acquainted with the whole drainage area of the Barrow?—No, I am not. I am only acquainted with the navigable portion of the river.

2155. If you look at the map you will find, with the exception of the Stradally district, and portion west of Portarlating, there is scarcely any elevated ground in the area. I was looking over the whole watershed basin, and with the exception of the locality I have mentioned there is scarcely any place with more than 100 feet difference of level—nearly 250 feet—so that no analogy could be made as between how the water would flow over this district and other districts which are not similarly circumstanced. For instance, the Lough Neagh district. The drainage area of that is for the most part very precipitous to the lake—I was speaking of the drainage out of the lake.

2156. Then if you take the drainage out of the lake, add the height to which the lake rises, and divide it by the area, and you will get nearly the quantity of water per acre per minute flowing off the land. So when you mention Lough Neagh it is not a case that will bear any resemblance to this district?—Yes; that the arguments which applied to the river Barrow or the Shannon should not be applied to this district.

2157. Because the areas are totally different. What I want to ascertain here is the quantity of water flowing off the ground. If you take the discharge—the quantity of water flowing out of Lough Neagh; add to that the height the lake rises to within a given period, and divide that over a certain period, it will give you the quantity of water per acre per minute that runs into the lake. Therefore you can form no analogy or resemblance between a district circumstanced as Lough Neagh, and a district circumstanced as the Barrow drainage district is?—No. I am not prepared to go into that.

2158. In fact a very much less quantity of water per acre per minute would flow off this district than off Lough Neagh?—I think that rather strengthens my statement.

2159. Here it flows off very slowly, while the drainage area of Lough Neagh is very precipitous ground, off which the water flows with great rapidity—something like the way it would flow off the roof of a house. What I want to get is, I say, the quantity of water running off the ground—and if you take the quantity discharged out of the lake and add the height to which the lake has risen, you can get the quantity per acre per minute flowing off that particular district. But that is not at all a district similar to this. You cannot form any comparison between them?—I quite agree with you. It may be of great use in drainage works to get the quantity of water that falls upon the ground and requires to be carried off the ground, but the only thing our Barrow Navigation Company is concerned with is the quantity of water put into the port of the river subject to our navigation.

2160. I think you said Mr. Emsley, in his report on the drainage district of Rathangan, stated that 1½ cubic feet was necessary to be provided for?—Yes.

2161. Well I don't know on what basis Mr. Emsley formed his opinion, but it certainly appears to me that 1½ feet would not be required here?—That may be so, but we don't consider that Mr. Manning has made any provision to carry off the one cubic foot per acre when it comes into our navigations.

2162. I am speaking generally, down to Athy?—Well, you see your interest ends where ours begins.

2163. There was a district lately authorized with which I am very familiar—the Lough Erne drainage district. Mr. Price was the engineer of that project. That is a locality in which the drainage area is also very steep indeed—and with a rainfall of 1.40 inches, or nearly 1½ inches in 24 hours, and that in the lowest part of a district which was only 272 feet above the sea, with a drainage area running as high as 2,200, I deemed 2 cubic feet per acre was enough?—In the case of a large lake like that, would not engineers make a considerable allowance for evaporation?

2164. Any evaporation in that short space of time would be very small?—But it seems to me that the volume of water that Mr. Manning says at the present time takes a fortnight or three weeks to be discharged at Achy must lose a considerable amount by evaporation in the course of that time.

2165. I was speaking of lakes. These floods occur at periods of the year when the evaporation would be very small and the loss would be imperceptible in that way. Then as regards the silt, you said you thought the quantity of silt would be largely increased by these works if carried out. Exactly the contrary would be the fact. My experience is that where the channel is confined or properly defined a less amount of silt is brought down than where the channel is not regular but unforging everywhere on the banks, causing the banks to fall in and be washed away and brought down as silt. If the channel is properly made and properly protected my experience is that the silt is very much less?—But are not new banks very likely to be broken?

2166. No, if the slopes are properly made. Mr. Manning in his evidence refers to the banks of the Lerr having fallen in in many places.

Mr. Manning.—I never saw the Lerr river in my life.

2167. Mr. HARRARD.—Oh, it is I can tell you all about the Lerr. The result has been this. Formerly there was an immense accumulation of mud and debris brought down in times of flood and carried into the Barrow. I am informed that the river, not having a regular channel, suffered denudation at every flood. But it is now straightened and carved here and there, and there is a wharf constructed just at Jerusalem bridge, just above where the Lerr comes into the Barrow. I made inquiry as to how that sand trap has worked, and the result of despoiling and confining the river to a distinct channel, and I was told by Mr. Hagus that the quantity of silt and gravel that now comes down is very much less indeed than formerly. The clearing out of that sand trap three times in two years is quite sufficient to keep any debris from going into the Barrow?—I am not sure that the evidence of our people would agree with that. I passed at the mouth of the Lerr the other day, and it appeared to me there was a certain accumulation of silt there and also that a considerable amount had been dredged out of it too. How long is it Mr. Webster since the last dredging. Mr. Webster is one of our officers.

Mr. Webster.—Two years ago.

2168. Mr. Le Touche.—I see it is Mr. Brazen who spoke about conserving the banks of the Lerr, and then Mr. Harrard says—

\* I did that—and when they were objected to I told Mr. Harrard, the Duke of Leinster's agent, that the inclosures were so steep that the slopes of one to one provided would be totally inadequate to resist the floods. They were afraid to incur any further expense at the time, but the result was they had to carry out that conserving protection for a great drainage afterwards."

2169. Mr. HARRARD.—The inclinations are very steep. They run from 12 feet to 30 feet per mile?—Yes, but the slopes are 1 to 1.

2170. I think you will find I state the slopes 1 to 1 are not sufficient. The same quantity of excavation

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La Touche.

would provide a waterway for slopes of 2 to 1, which I would be disposed to adopt. It need not increase the expense—Yes, but Mr. Breen then asks would not the same thing occur in this case. He asks—

"Is there as far as in some part of the Barrow's course the same difficulty may arise and the same failure?"

And Mr. Manning says—

"No doubt, but I have not gone over every portion of the river's course to see where that difficulty would arise."

2171. Mr. HAMARD.—Yes, that is if the slopes were not properly provided in the first instance. The channel might be formed with slopes of 2 to 1, and the same quantity of excavation will suffice. There need not be any additional outlay from that cause.

2172. Mr. HAYES.—You mentioned your charter of 1791?—Yes.

2173. What was the depth that was mentioned in that charter for the navigation?—There is no depth mentioned in the charter.

2174. Then there is no depth that you are bound to maintain?—There is no depth we are bound to maintain.

2175. What is the depth you do maintain practically?—The bottom of the river is so uneven it is hard to tell. As far as we can tell from comparing the present soundings of the river with the soundings which were taken thirty years ago—in 1853, they represent practically the same. In August, 1853, Mr. Mulvaney made a careful inspection of the river, and consequent upon the report he wrote we made soundings of the shallowest places that he mentioned. On the 31st July last Mr. Mitchell went over the same portion of the river and took soundings at the same places—that is after an interval of thirty-two years all but one month—and the result of these soundings was to show practically the same state of things existed. There might be places where the river was an inch to an inch and a half lower than in 1853, the level was taken at the locks. At Andree canal there was a shoal which in 1853 was 3 feet 10 inches deep, and in July, 1885, there was 4 feet 1 inch of water over it. In Farwell in 1853 the depth was 3 feet 8 inches, and in July, 1885, it was 3 feet 7 inches. I can go on with the particulars, but there is no perceptible difference. On the whole the river is now slightly deeper than it was then.

2176. The level of the water being taken at your locks—you say the level of the river was an inch and a half lower?—It was an inch and a half higher when Mr. Mulvaney's inspection was made in 1853 than when Mr. Mitchell made his examination in 1885.

2177. Now what is the standard that determines that?—The upper sill of the lock.

2178. Is it your opinion that the bed of the river is the same as it was thirty years ago?—That is our opinion. Mr. Manning, who is thoroughly acquainted with the whole course of the navigable river, will be able to answer questions upon that subject. I can only speak from memory.

2179. There is an obligation, if I am rightly informed, in your charter, as to the keeping free of the river for drainage purposes—for the discharge of water—in them not?—I don't know if it is included in our charter. If we allowed our back drain to become in such a state as not to be able to carry off the flow of water in the drains and the fields we would be subject to prosecution.

2180. You are of opinion that that obligation does not extend to the bed of the river properly so called?—I should conclude we are under certain obligations to keep the whole river in the same condition it was in or as much as possible to the condition it was in when it was given over to us.

2181. Are your works, in your opinion, capable of bearing an increased strain upon them supposing that higher floods were sent down in consequence of the new drainage works?—I am inclined to think they are not, because in one heavy flood that we had in

1874, there was a very serious breach made in one of our embankments at a place called Timahinch, and there was great interruption to the traffic in consequence,\* at any rate our works were not constructed with any idea of being able to withstand any greater volume of water than they have been accustomed to.

2182. When was the Rathangan drainage finished?—About five years ago.

2183. You say the water coming down from that district does not affect your part?—Not to any very great extent.

2184. Mr. SMITH.—Perhaps you are under the impression that the water from all the different parts of the Barrow would come down at one time, or at least within twenty-four hours?—We think that by the new system that will probably take place.

2185. You will find that will not be so, because the tributaries that are down the river—on the larger Barrow—they will discharge themselves before the little Barrow begins to come down at all. In my neighbourhood in the Queen's County we have the Omara, a steep river, and it discharges itself twelve or fourteen hours before the little Barrow comes down at all—so that you won't have the water down at all as quickly as you expect in your neighbourhood, at least from the little Barrow?—We are aware that at present the tributaries discharge their water into the Barrow infinitely faster than the water of the main river. But the velocity of the water in the main river is to be so increased, that we believe it will be able to keep itself almost up with the tributaries, and that they will both come down about the same time. Mr. Manning says, that it takes a fortnight or three weeks now, for what will come down in nineteen or twenty hours.

2186. Mr. Manning.—Kindly refer me to that statement. The statement was when the reservoir filled, when the flood would be discharged, and I said it would probably take a week or a fortnight, that is a very different thing to what you have been stating, I am sure unconsciously.

2187. Mr. La Touche.—You say "I would suppose after a heavy rainfall in the valley of the Barrow above Athy the flood might get off in a fortnight or three weeks, or longer, according to circumstances."

2188. Mr. Manning.—That is that the land would be relieved, which is quite a different thing to what you are talking of.

2189. Mr. La Touche.—The land being relieved is only another way of saying that the floods will go off in that time.

2190. Mr. HAMARD.—I told you I calculated what the discharges were at Athy and Carlow 1-11 and 1-10 cubic feet per minute, and I have compared that with what Mr. Mulvaney says would be the discharging capacity of the river or weir, and I find it just works out what I told you. A weir of 1,600 feet with the water running 18 inches on the top gives 1-17 cubic feet per acre per minute, so that the difference is not much.

2191. Lord CASTLETOWN.—But that infers that there would be works in connexion with the drainage down below in order to extend to Bessfield weir.

2192. Mr. HAMARD.—If Mr. Mulvaney assumes it would be 1-17, and that 1-10 must pass over it now, the condition of things won't be materially altered.

2193. Mr. La Touche.—But now it takes a fortnight or three weeks for the water to pass over that weir, and under the improved drainage scheme the water would be sent down very suddenly.

2194. Mr. HAMARD.—Mr. Mulvaney asks for 1-17 cubic feet per minute for the proposed scheme.

2195. Mr. La Touche.—But Mr. Mulvaney says it would take a weir 1,600 feet long with 18 inches of water on it to carry off 400,000 cubic feet in a minute. You spoke of measuring the water passing at Carlow in the flood of 1879. Did you include the amount of water that was passing through the two mills?

2196. Mr. HAMARD.—No, but that must have been

\* See Appendix.

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to Towns.

a very small quantity. I doubt if a mill could work at all in that flood. The back water was so high that there was only a fall of one foot ten inches at that time.

2187. Mr. Le Touche.—What was the depth on the weir?

2188. Mr. HANNAH.—Three feet ten inches. The weir was submerged. It was a drowned weir.

2189. Mr. BATES.—Might I ask the quantity which passed Carlow at that time?

2190. Mr. HANNAH.—554,600 cubic feet per minute.

Mr. Manning,  
C.E.

Mr. Manning, C.E., examined.

2201. Mr. Le Touche.—It appears, as a rule, that in executing drainage works, the plan is to begin at the bottom and work upwards; that is to say, it is generally considered advisable to see that the outlet is clear before the upper portion of the land to be drained is touched?—Yes, at least it is not necessary to wait to have the upper portion finished before you commence the lower; or, the contrary, you can go on simultaneously at different points of the district to carry out the drainage of it.

2202. I know in agricultural operations it is generally the plan, at least you would be very much surprised to see your labourer clearing out a drain if he did not begin at the bottom and clear from the outfall before proceeding to the upper part?—I think I know what you mean—that there is an objection to deal with the upper portion of a river without having dealt with the lower portion. That may be the case or not according to the particular circumstances you are dealing with. In fact the problem is indeterminate—every case has its own circumstances. In one case it would be very wrong to drain in the upper part of a river, and in another case it would not make any difference.

2203. Might I ask whether you consider it would be judicious to do so with the river Barrow?—I have not, as you properly observed, seen it below Athy. I believe the quantity of water sent down by these drainages will be very little increased—that it will make no difference in the lower reaches of the river. Probably you will allow me to say that you have been at the disadvantage of not having had an engineer to state what you have to say, and which you have put forward as a hypothesis. You have sometimes mixed up two or three things together. For example, first of all, the error in my figures. That error in my figures seems to have gone far and wide. It was a statement that so many square miles were equal to so many square acres. I hoped it was a misprint. It was not a misprint; it was a clerical error in the office, through taking a 7 for the figure 1, and putting down the latter for the former; but anyone who had carefully read over that preliminary report would see that there was nothing founded on that error, for it was clearly stated that the quantity of water to be discharged was 400,000 cubic feet per minute.

2204. Mr. Le Touche.—I acknowledge that.

2205. Mr. Manning.—Then, as to the length of the weir—1,000 feet, with eighteen inches of water on it, of which Mr. Mulvany has spoken. I cannot understand that, but I am sure that if I read over his report I could understand it. As you have given his statement, it is really without meaning, and I will show you how. The length of the weir is supposed to be 1,000 feet. In another case the weir is 457 feet, and between Carlow and Athy there is one weir only 150 feet. Then, if a flood took eighteen inches of water going over a weir 1,000 feet in length, what would it take to go over a 150 feet weir? Therefore the length of the weir is no criterion at all. With regard to the quantity of water discharged by the Rathangan district, you stated a matter which I was not aware of before—that my predecessor, an Engineer-in-Chief of the Board of Works, had stated he had estimated for one and a quarter cubic feet per minute per acre. I was aware that the Board of Works took that thirty years ago, but I have rather gone beyond that. If you take the total discharge you will find that for a catchment basin of 78,000 acres I give 100,000 cubic feet per minute, that is, about  $1\frac{1}{4}$  cubic

feet per acre per minute, while Mr. Forsythe only estimated for  $1\frac{1}{2}$ .

\*2206. Mr. Le Touche.—But is that calculation about the river Barrow?—Yes, from Mullagh bridge to the junction of the Slane river is 78,000 acres, and the quantity of water I estimate at 100,000 cubic feet per minute. That you will find calculates for about  $1\frac{1}{4}$  cubic feet per acre per minute, so that I have actually exaggerated the quantity of water given for Rathangan, if you take Mr. Forsythe's and Mr. Mulvany's statements to be correct.

2206. I understood you estimated at 400,000 cubic feet?—At Athy, yes.

2207. And you are now speaking of the Rathangan district?—Yes. You here only assume one foot per acre, and Mr. Forsythe assumed  $1\frac{1}{2}$  for Rathangan. Mr. Forsythe was perfectly right. The larger the district the smaller the proportional quantity.

2208. But surely the nature of the Rathangan basin is very much the same as the nature of the Barrow basin?—Yes, except only that it is smaller. It is one-tenth the size of the Barrow area, and I think if you do me the honour of reading over my report, you will see as the river-basin increases the proportional quantity of discharge per acre gets smaller. Another thing that struck me was with regard to the silt. You said that we would send down silt into your portion of the river. If you look into my report you will find that I hope, by settling the rapids of the river, to prevent the sand or silt being carried down at all. I say—

"And I may here remark that whenever the detailed plans come to be made, it may be prudent to revise the designs for the upper reaches, wherever necessary, by reducing their depths and increasing their widths. Particular attention should also be given to the establishing a permanent regime in the Ouse and other tributaries of the Little Barrow, so as to prevent, as far as possible, sand and gravel being carried into the lower reaches, and then deposited in large quantities."

It is my intention to regulate the channel, so that the river shall not actually send down or supply it with silt.

2209. But, at the same time, you acknowledge that the banks are liable to fall in?—You, as a disinterested man, and the Commissioner, Mr. Hannah, seemed to be playing at cross-purposes. Mr. Hannah was speaking of the longitudinal slope of the river, which is the fall of the bed of the river lengthwise, and then you commenced talking of the effect on the sides of the river channel, and really I don't think that you followed the thing up.

2210. The sides of the river are more likely to be affected than the bed of the river—it is at the sides of the river the banks fall in?—But it is the longitudinal slope which causes the velocity of the river that tears away the side banks.

2211. And you calculate the velocity to be something like four miles an hour?—About four feet a second, which is the maximum velocity during flood. There was another thing which you said which I don't quite understand, and Mr. Hannah appeared to agree in your view, namely, that it was useless to compute such districts as Lough Neagh or the Slaneon with such a district as this. If that was the meaning of what was said, I am afraid I must disagree with both of you. If you limit yourself to the facts collected in the small district, such as the Slane river, or up by Portlurling to the mountains, you will never come to a correct result. It is by comparing rivers, large and small, that it is known, what quantity of water will

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be discharged in any one of them. In this particular case, as Mr. Hammond clearly pointed out to you, the object is to find out the quantity of water that flowed off the ground. I find he here stated in regard to Lough Neagh that eight-tenths of a cubic foot per acre were delivered into the lake in twenty-four hours, and but for the compensating power of the lake there would have been a quantity of 1-4 cubic foot per minute discharged from that district. But the reason of that is that that district is very precipitous, and it is not to be compared with this district in that respect. But, instead of being one-fourth, I have it less than one. But then if you confine yourself to the district immediately about here—why in the Bann river, which is only 285,000 acres in extent, as against 160,000 acres in the Barrow, you will find the greatest flood ever seen there was 367,400 cubic feet in a minute—that amounts to less than a cubic foot per acre per minute. From 1851 down to the year 1877 the discharge was 218,000, 230,000, 227,000, 214,000, 206,000, and so on, but not near a foot per acre, so you find an important river, as near your district as can be and as like it as possible, not giving off one foot per acre per minute, I don't know I have anything more to say on that subject.

2212 Mr. Mulvany was quite prepared to submit—in fact, he accepted your figure of 400,000 cubic feet per minute in making his calculation about the length of the weir and the depth of the water thereon—but Mr. Hammond appears to have overestimated the quantity of water flowing down during a flood at Colerue to be 524,000 cubic feet in a minute!—So that in that respect the 400,000 cubic feet per minute does not exceed what has already gone down.

2213. I don't know that you have stated what particular features you saw in the Barrow which make you think it would not be injurious to drain the upper portion of the river before any alteration is made in the lower!—I believe that the alterations proposed to be made in the upper part above Athy will not make much increase in the discharge. It has been proved as a fact in similar cases that it will not increase the discharge, and therefore it would not be injurious. It would be injudicious to deal with small tributaries all coming together and not give an outlet at Athy. I think that would be very injudicious.

2214. Lord Carrington.—Would you mind stating what you propose to do with regard to the Duke's weir here? I think it would be of great value!—I propose to deepen the bed of the river under Athy half a mile between five and six feet and to raise on that level.

2215. Is not there a weir above Athy that you see from the bridge—the Duke's weir!—The Duke's weir is above the bridge. I have not the exact figures here as to the height of the top of the Duke's weir, but the bottom of my channel would be about nine feet below the crest of the Duke's weir, and we propose to carry a channel 100 feet wide with a fall of 1½ feet per mile up to beyond Bert bridge. Then with regard to what is to be done with the weir. First of all, it would be necessary to put sluices in, or to reconstruct the navigation below the bridge.

2216. Will you confine yourself to the weir just below the bridge!—That is the one you talk of—the one immediately below the bridge, called the Andrew weir.

2217. The weir I am referring to is the weir between Hoesbridge and Athy bridge!—Which is below Hoesbridge—at the junction of the Grand Canal. Well, it would be necessary to put sluices into that weir.

2218. What would be the object of these sluices!—The object is to lower the point of discharge as much as you can, so as to be able to have the inclination in the river channel is flood.

2219. Mr. Le Toullec.—Would these sluices have any effect on the navigation in your opinion!—None in the world so far as I know. I mentioned in my examination that subject as to the navigation crossing

the Barrow. I do not now speak of your navigation at all below Athy. All you have said may be perfectly true below Athy. I know nothing about it. The only inconvenience you could suffer would be in the 100 yards in which you navigate the river from the toll lay of the Grand Canal lock. But I think the drainage there would be of good service to you. At present the towpath from that weir down to Andrew mills is continually under winter flood.

2220. Oh, not the towpath of the Canal!—I have seen it myself. You have gentlemen here who will tell you whether it is so or not.

2221. Is that so!—The water may come up in very high floods.

Mr. Webster.—It is very little flooded. But it has been flooded.

2222. Mr. Manning.—I heard it is flooded every year. These sluices in the weir will keep the flood down so that you will have less current there.

2223. Lord Carrington.—Is there any proposition to do anything below that!—None, at all. We take the height of the navigation weir as our commencement.

2224. And you would prefer in point of fact not to give evidence as to any thing below that!—I can give no evidence as to anything below Athy, I know nothing about it.

2225. Mr. Le Toullec.—But you are not prepared to say it would not be necessary to execute some works below the weir as you propose here!—It depends on the truth of what Mr. Hammond told you to day. If he has satisfied himself that the amount at Colerue at high floods, now, is 600,000 cubic feet per minute, then I say they are not necessary—for we don't intend to send down any more.

2226. Mr. Hammond.—What is the length of the weir at Athy!—I don't know.

2227. It is about 212 feet irrespective of the sluices. You would, I presume, lengthen that weir considerably!—The width at the bottom would be 160 feet—200 feet you might call it.

2228. I am speaking of a weir which is 210 feet in length!—I would build that weir the whole length of the new river—180—in addition to some piers.

2229. That would involve new work!—Yes.

2230. And new piers!—Yes.

2231. And that would involve a certain amount for maintenance, which with the work should be capitalised to represent the total cost!—Yes.

2232. And the same thing would be required at the navigation weir when you remove it to another site!—I think when you come to execute the works at the navigation weir, you will find it would be better for you to build your weir with the old navigation weir as a dam above it.

2233. But would it not involve a new weir and new sluices and new works similar to the works at the Duke's weir!—It would.

2234. And that would be a costly matter!—Yes.

2235. And if these two new weirs were erected at the present level it would not lower the summer level at Athy!—The level of the water would be practically the same. There would be no leakage from the new ones.

2236. Will you give me your opinion about this—let me direct your attention to lock 28. We are now talking about the removal of the navigation weir altogether. When a boat comes out of the 28 lock, she has got to proceed up stream and that is a very difficult matter—the whole way across!—Yes.

2237. If lock 28 was abandoned altogether and a new lock built with a double lift (the navigation weir being done away with altogether) you would be then able to lower the water when passing the town of Athy, and come into flood water instead of having to come into the river under the objectionable circumstances that now exist—do you see any objection to that!—It is merely a question of expense—which is the cheapest to do. If you put a lock there or an addi-

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tional chamber you need not have that level, provided you have depth enough.

2232. Mr. *Le Fouache*.—You must remember that our navigation does not come at that weir, it comes up to this courthouse we are standing in. If you took away that weir the river would be still navigable.

2233. Mr. *HARRISON*.—The river between that weir and Andree weir ought to be deepened for navigation

and there ought to be a channel made for bringing your boats up to Athy.

2234. Mr. *Le Fouache*.—I don't think the Barrow Navigation Company would have any objection to that—but you should provide us with sufficient depth.

2235. Mr. *Charles Houghton (Andree)*.—You should hear the Andree mill in mind when making these remarks.

Mr. John Keating.

Mr. John Keating, examined.

2241. Mr. *BIDES*.—You know the course of the Barrow navigation pretty well from Athy downwards?—Yes.

2242. Do you know it for many years past?—For thirty-five years.

2243. Can you speak at all as to the banks of the river—as to whether they have grown in or contracted at all?—I think I can, a good deal.

2244. Have you observed that they contracted the course of the river at all?—I did not notice any particular change in the embankments along the navigation at all.

2245. I don't mean the embankments, I mean the sides of the river?—I did not notice any material change at all.

2246. Have you observed that any new banks have been formed?—None in my district but one, which is below Lodge mills at Ragnallstown. There is a small accumulation there since I came to that place.

2247. Only that one island?—Yes, it is opposite Captain Hardy's, at Eastwood.

2248. Have you observed whether the old canal have increased in size?—I have not noticed any change whatever. I think they are the very same as when I was a boy. The boat channel in most cases runs by them, and the boat keeps the same course as it did thirty-five years ago.

2249. You are confining your remarks to the canal. I am asking you not only about the canal, but the river itself also?—I speak generally. I have not noticed that these islands have increased in size anything whatever, and I am speaking also as regards the depth of water in the river.

Mr. *Charles Houghton (Andree)*.—I wish to ask about the effect on Andree mill.

Lord *CAMMERMEYER*.—I think it would be better for you to ask Mr. Manning with regard to the effect on the Andree mill by the proposed scheme. [Mr. Manning recalled.]

2250. Mr. *Houghton (to Mr. Manning)*.—Of course the altering of the navigation was one inch would effect the power of Andree mill?—Certainly. The Andree mill draws its head water from that weir, and one inch or half an inch would affect it.

2251. I don't know whether in changing the weir you intend to leave it at the same level as now?—I told you it is intended to start from the level of that weir, and that it is a fixed point not to lower the level

of the Duke's weir. If the suggestion made by one of the Commissioners is carried into effect on consideration, then it would be necessary to purchase Andree mills.

2252. As Mr. *Le Fouache* remarked, we have always looked upon the upper part of this country as a reservoir for our mill, and we have noticed a great change since the drain was made by the Duke of Leinster. The head water comes down faster and runs away faster than it used in former years?—I remember years ago a miller who had an interest in the river Blackwater, near Drogheda, where it goes into the river Boyne, and he stated distinctly that from the time the Board of Works executed works upon the upper part of that river he had never so much water again. The fact was that there had never been any works done on that Blackwater at all, but on another Blackwater, and the miller attributed the loss of the water to the works executed on a river that was not near him at all.

2253. Is the river, then, by deepening, to form a reservoir for the country?—I may best explain that by saying those questions of degree cannot be worked upon general principles. If you take a gallon of water and put it into the sea I must acknowledge it rises its level. Well, there is the other degree, for putting half so much water into the sea will raise it half so high again. These questions cannot be generalised.

2254. Sir *JOHN McKEEVER*.—In those districts which have large compensating lakes like Lough Neagh, and the Shannon, which has two lakes, Ree and Derg, what is your experience of arterial works carried out with regard to the discharge of flood water. Is it more or less?—It varies. In some cases it is a little more, sometimes it is less. Even independent of compensating reservoirs it depends altogether on the condition of the tributaries and the length of them. As a general fact, the popular idea that drainage will greatly increase flood discharge is in my opinion very erroneous, and the statements are exaggerated. I have stated that also in my report.

2255. Is that your knowledge of the result to the drainage districts which have been carried out under the Board of Works?—Yes, as far as my 25 years' experience goes.

Mr. *Penny*.—Is there any other gentleman here who wishes to give evidence?

Mr. A. E. Forrehoyle.

Mr. A. E. Forrehoyle examined.

2256. Lord *CAMMERMEYER*.—Do you wish to make a statement?—I wish to say there is a larger area of my lands put down for compensation as being benefited than the circumstances bear out. I have also evidence to show the amount of injury done at present which the upper drainage works cast on this property.

2257. What is it you object to?—The total area of flooded and injured land is put down at 2,664 acres. I think that is excessive. The whole property is only 3,800 acres, and I don't think there is more than half of it really injured.

2258. There is a great deal of it marked as flooded. Do you think that is correct?—I think it is very

seldom flooded. The permanently flooded is I think correct.

2259. What amount do you say—for the valuations will have to come and see it again?—Lowdown and Cloney.

2260. And Kilberry?—There is not much in Kilberry.

2261. Are those lands flooded?—I think they are.

2262. Then as to the present value, is that properly stated?—I think that is about correct.

2263. And the improvement value?—As an assessable value, I think it is not so exact.

2264. Do you notice there is a large portion of deep bog marked in it?—I object to that.

2265. You believe there is no improved value to be put on that?—No, we drain it at present.

2266. No improvement value even to the extent of 1s. an acre?—No, I don't believe it would be improved in value at all.

Mr. John Gilmore examined.

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Mr. A. H. Vaneboyle.

Mr. John Gilmore.

2268. Mr. Vaneboyle.—You have observed great loss to the crops since the Duke's weir was done?—Yes.

2269. To what township especially?—Clonay.

2270. I believe they are only worth about one-third of what they were formerly?—About that.

2271. And there has been an increase of flooding at those houses about the Finny river along the canal?—Yes.

2272. Up to one foot of water in them?—Yes, and a good many of them have fallen in, in consequence of the water.

2273. Lord Castletown.—Have the occupants been obliged to leave their houses?—Yes.

2274. Since when was that?—Well, since about 14 when the Duke's weir was completed.

2275. And it has been getting worse every year?—It has been getting worse every year except last year which was not so bad.

2276. The channel has got filled up?—Yes, considerably filled up, and fresh banks accumulated.

2277. Mr. Vaneboyle.—There are places where it is only a foot over these banks, but there is very deep water behind. Have you noticed any damage to the tillage land from the flood?—Oh, it affects any thing near it. It won't allow the drains to work where the land is drained.—It floods back.

2278. Lord Castletown.—Is it your opinion that you could drain that land properly if the river was sunk?—There is no doubt about it. All we want is an outlet.

2279. Mr. Vaneboyle.—Have you not noticed the back water remaining very long?—Yes.

2280. And that the chief injury we suffer is from the back water?—Principally.

2281. The land on your farm, that used to be a very good meadow—is it now under water all the summer too?—Yes, it is a regular puddle. Formerly—some years ago meadow was taken off it—now you would not have a chance of walking it, except a little bit, you would actually sink in it now.

2282. Sir John McKelvie.—Does this land continue in a wet state all the year round?—Part of it, at present it is flooded.

2283. Mr. Cassin.—Is that due altogether to the filling up of the Barrow?—I would suppose that there is no outlet for the bog river. At the mouth of the river there is mud ten feet high, and no sign of the weir above it. In some cases Mr. Vaneboyle got

2287. I think your engineer was here and gave evidence as to the effect the main drainage has had on you?—Yes, I wanted to produce evidence as to the increased flooding on account of the Duke's weir.

drains made for the accommodation of the tenants, and sometimes the flood would get over the dams in the low part of it.

2284. Mr. Bruce.—And you think the flooding was greatly increased by the drainage works carried out by the Duke?—I have no doubt of it, as far as I can understand it.

Mr. Price.—I would like to know what quantity of the bog is to be drained. Perhaps the secretary can tell me. The number of acres is not given.

Lord Castletown.—They are included in the drainage area.

Mr. Price.—The quantity of flooded land is stated to be 55,000 acres—a great deal depends on whether that includes the bog, which is in the nature of a reserve for holding water.

Lord Castletown.—It includes some bog wherever it comes within the valuation.

Mr. Price.—But the bog not coming within the valuation will act as a sponge.

Lord Castletown.—I think you will find evidence given on that subject in Dublin.

Sir John McKelvie.—There is a large area about Edenderry which is not included.

Mr. Price.—The bog is a most important area for holding up the water and letting the floods come down gradually. I am not able to find out exactly in the evidence if there are 55,000 acres of bog included in addition to 40,000 to be improved. There would be a very appreciable difference.

Lord Castletown.—The bog is only marked where it comes within the valuation schedule.

Mr. Price.—I take it that this scheme would drain the bog of Allen.

Lord Castletown.—There is no evidence of that sort.

Mr. Price.—It is a very important question, which I shall have to give evidence on at Carlow. There is no evidence as to this large porridge area of bog holding up the water, and there is another matter—that the bog may be materially improved and ought to come within the valuation area.

Lord Castletown.—Your contention is one which we will consider very much.

I am afraid that by to-morrow we shall not have evidence to give you as to the amount. It is very easy to get the information. I attach a great deal of importance to what you say on the subject.

The Commission adjourned till next day at Carlow.

## WEDNESDAY, 29TH JULY, 1885.

July 29, 1885.

The Commission sat in the Courthouse, Carlow.

Present:—The Right Hon. Mr. BRUCE, Vice-Chairman, presiding; Sir JOHN M'KELVIE, Mr. HASSARD, Mr. HUMPHREY SMITH, and Mr. CASSIN.

Mr. PENNY, Secretary, was in attendance.

Mr. BRUCE.—In the absence of Lord Castletown, Chairman of this Commission, an absence which I much regret and which has engagements rendered necessary, I have now to say that the Commission appointed by the Lord Lieutenant to inquire into the drainage of the Barrow and the district and tributaries is now open here. We are prepared to hear any evi-

dence with regard to the scheme and also as to this district of the Barrow which is below the operations of the scheme and which may perhaps be affected by the works to be carried out. Were there any witnesses summoned?

Mr. PENNY.—None specially; but I have got a letter from the Barrow Drainage Committee asking a list

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of persons that they wish to have examined here to-day, and they are represented.

Mr. La Fosse.—Will you allow me to ask a question which arises more or less out of the evidence given

yesterday at Athy on the part of the Barrow Navigation Company?

Mr. BAKER.—I am sure Mr. Manning will be happy to answer any question.

Mr. Manning.

Mr. Manning re-examined.

2285. Mr. La Fosse.—I believe you acknowledge the value of compensating reservoirs as regulating and controlling the discharge of floods?—Yes.

2286. Might I ask how you propose to regulate and control the floods of the Barrow without compensating reservoirs?—Where there is a compensating reservoir for a river it decreases the maximum discharge of the river; but there is no compensation by reservoir in the Barrow. There is at present, during heavy floods, for once, a compensating reservoir, so to speak, in the flooded lands; but the extent of those flooded lands is only 22,816 acres at, say, a foot deep, and I say the compensating power of that reservoir will not be appreciable in a catchment of 400,000 acres.

2287. There is one question I would like to ask you. I believe you stated yesterday that it was one of the provisions of this scheme to erect flood gates and sluices in the first of the navigation weirs at Athy, or at Ardree weir?—Yes.

2288. I conclude these flood-gates or sluices are for the purpose of regulating the water from some of the persons of the flood water?—What weir are you speaking of?

2289. The Ardree weir?—No, there is no such object.

2290. Well, it was with the intention I conclude of the better carrying off the flood?—The object of putting sluices in Ardree weir, or probably in the weir to be built in lieu of Ardree weir, if found necessary, is to lower the discharging point to the navigation level if possible at that point, and for no other reason.

2291. If it was necessary to put sluices into the weir at Ardree, why is it not considered necessary to put them in any of the navigation weirs?—There is no question of drainage below Athy. We don't propose to drain any land below Athy, and so to the effect of the sluices in a great flood of that kind, and a flood you need not go further than this town of Carlow. The huge weir which sustains the head water at Shackleton's mill is scarcely to be seen in a flood. It is merely seen by the ripple of the water, and in that case you would have very little need of sluices. You would not lower the Barrow at Carlow, during a high flood, probably, half an inch by all the sluices you could put into it.

2292. I think it was in Dublin Mr. Hammond asked you the question as to the amount of water passing

over the weir at Athy, and you stated it would be extremely difficult to measure the amount of water passing over any weir that was not perfectly level, and that it was oblique to the channel. Now, the weir at Carlow is, I believe, oblique to the channel and it also contains sluices. Mr. Hammond informed us yesterday that he had measured the amount of water passing over that weir in time of high flood, and I gathered from your remarks in Dublin that it was extremely difficult to do so exactly. Do you consider that this answer given by Mr. Hammond is exact?—I have no information as to Mr. Hammond's experiments at all. I adhere to my statement in Dublin, that it is a most difficult thing to calculate exactly the quantity of water passing over a drowned weir in time of flood, particularly if they have not had very accurate observations at the weir. I confined myself to that reply in Dublin for this reason. My words were beginning to be weighed as they are weighed by you now. I know that people would be weighing them all along and would say, perhaps, "Oh! there is a pretty engineer, he was not within 20 or 30 per cent. of the quantity of water." Mr. Hammond will be able to tell you how near he made his observations.

2293. But perhaps it would not be right for me to ask the Commissioner a question?—Well, I can't speak for his observations.

Mr. PENNY.—I have received the following letter from the Barrow Drainage Committee.

Carlow, 22nd July, 1889.

"Dear Sir.—I was directed by the Barrow Drainage Committee to forward to you enclosed, a list of the names and addresses of several witnesses to be examined at the meeting of your Commission, on the 24th inst., and I am to request that you will inform me whether I will enclose them to attend at Carlow, or will your Commissioners give them formal notice of the meeting. I am also to ask the intention of your Commissioners to hold meetings between Carlow and St. Malina.

I am, your faithfully,  
JAMES KILPATRICK, Secy.

John S. Penny, Esq.,  
Secretary, Barrow Drainage Commission."

All the parties named were served with notice to attend this meeting, and the secretary was informed that it was not the intention to hold any meetings lower down the river than this. The first witness named is Mr. Price, C.E.

Mr. James Price, C.E.

Mr. James Price, C.E., examined.

2294. Mr. BAKER.—Mr. Price, are you prepared to go on with your case?—Mr. BAKER and gentleman, I have been called upon by various interests in the Lower Barrow to look into the plans and consider the whole question, and I think they have done wise in doing so beforehand. They are apprehensive that the operations that are contemplated in the upper portion of the Barrow will in some way affect the condition of the lower river lower down—and they are quite right in that—and they have asked me to consider the question—how far it would be necessary that the drainage contemplated should include also certain works connected with the lower part of the river. The interests with reference to this river, which are concerned in this consideration, are threefold. They are the owners of land along the margin of the lower river, who are flooded at present, and who apprehend that the floods may be either greater or more frequent

than they were before. I have roughly examined these lands, but I have not been able to make anything like a measurement or estimate of the area, so that I cannot state that to you. It is not inconsiderable. In certain places it is valuable land. The other interests are the mill owners who have a very important interest in this river. There are several large mills at Levestown, Bagenalstown, and other places, having considerable interest in the water power, both that they may have a proper supply in summer, and that they may be kept free from back-water, which they apprehend may occur if the floods are more frequent. There are also besides the owners of mills, owners of very extensive malt-stores, which have been built contiguous to the river at Leighton Bridge and at Carlow. There are stores of Mr. Watson at Leighton Bridge—very extensive malt-stores—which, if the river should rise even a few inches higher, would be seriously damaged

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Mr James  
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and flooded. There are also stores here in Carlow—Mr. Norton's stores—and there is, in fact, a portion of the town of Carlow which is submerged at present in times of great flood—Cornwall quay. The flood comes right over that and floods the low ground at Graigue, on the Graigue side of the town, and in a sanitary point of view, of course, it is very bad at present. I just mention these things to show the importance of the question which is now laid before you—that these floods should not be increased in any way, and that it should not be left to chance at all that these should be ever so little an increase of flood. The other interest is a very important one too—that is the interest of navigation, and it has been so clearly put before you yesterday by the Chairman of the Barrow Navigation that very little remains for me to say on the subject. Something remains for me to do, for I have connected into the question with reference to navigation as well as with reference to other interests. The navigation is very important to this part of the country. There is a portion of the Barrow which passes through the country which is not at all accommodated by railways, and the mills and stores on the Barrow make considerable use of the navigation which communicates with the sea, as you are aware; so that they can bring up corn and other things from New Ross and Waterford. There is no doubt about it but the navigation is a matter of considerable importance, and together with other interests will have to be considered. You will observe, therefore, gentlemen in reference to the Barrow that it is not like an ordinary river in which there is only one or two interests to be considered. Here there are a great many interests, and these interests are all of great importance. Now the danger of trying an experiment, so to speak, with the floods of this river will appear to you at once from this consideration, that there is no other large drainage scheme in Ireland that has been carried out parallel to this. There are no doubt small ones, but the large drainage districts are entirely the reverse of this, and there are facilities attaching to them which do not attach to this district of the Barrow—facilities which have been mentioned. The Lower Bann has a large compensating reservoir at Lough Neagh. The Erne drainage, in which I am engaged myself, has a large area of two large lakes, Upper and Lower Lough Erne, in addition to an immense peatage in Lough Ogish and Gowna in the county Cavan. Then there is the Shannon which, as you are aware, has very large lakes in its course. Then there is the Corrib, which has Lough Corrib and the upper lake area as compensating reservoirs. Therefore I say that this particular district is unlike any others. I therefore say it requires to be very carefully measured into beforehand as to what the effects of the drainage will be in bringing down water in the lower river, whether it would bring the water down faster, or bring down the flood more frequently. Now that, of course, is a very much disputed question among different engineers. I have heard various engineers take different views of the matter. I have heard it advocated very strongly that drainage does not aid, as a general rule, to the maximum flood of the district. The reason given for it is this, and it certainly no doubt is valid in a good many cases, that once the peatage reservoir is full—that is this large reservoir of flooded lands of the Barrow district—that all the rain which falls after that period should necessarily find its way down into the channels here into the channel of the Barrow, and that therefore the maximum flood will not be increased by these drainage operations. Well, in a great many cases, this is no doubt perfectly true, but then there is another consideration that has to be taken into account, and it is this, that if the state of the river is such, or the drainage area of the river is such that the floods which are supplied from the tributaries can run off before the flood comes down, then the normal state of the river before there is any drainage will certainly give you less flood than if by cutting the upper part you bring

down the floods so as to be contemporaneous with the discharge of the floods from the minor tributaries. For instance, take the tributaries in this river that come in between Athy and Carlow. There is the Graigue river and Douglas, and the Lerr. These all come in below Athy and above Carlow. Well, these rivers are short rivers. I think it is the experience of most engineers that a four days run is about as great a continuance of rain as generally takes place in this country. Suppose the four days flood water came pouring into the basin of the Barrow, it is natural to suppose that the tributaries, which are shorter and faster formed, would run off their floods before the main body of the flood from the higher flood lands of the Barrow would come down. I think it stands to reason that is so, but if by any change the drainage of the water of the upper part of the Barrow will run down at the same time and meet the others, there is no doubt but that it would increase the maximum flood. I have just divided the area into the different parts of the Barrow. Above Athy (as given by Mr. Manning), there are 407,480 acres. From Athy to Bagnalstown there are 194,480 acres. From Bagnalstown to St. Mullins, there are 88,948 acres. Below St. Mullins there are 64,640 acres. The whole drainage area being 755,548 estate acres.

\*2294. Mr. Barrington—Is that the catchment basin of this district?—Of each of the districts as far as I can make them out. Of course I could not go into any great minutiae, but I made it out in square miles. Now, it is quite plain, that, according to Mr. Manning's calculation, which I may say I generally agree in from examination of the plans, I hardly think there would be at Athy more than 400,000 cubic feet per minute, but when you come to add to that what comes in between Athy and Bagnalstown, you might have about 600,000 cubic feet per minute. The question is, did all that quantity come down, and run down to the lower part of the Barrow at the same time. I dare say on certain occasions it might have come down at the same time, but I don't think generally it would; probably once in ten or twenty years the tributary supplies may be met by the supplies from the upper district, but I should think that if the drainage is carried out in the upper district, there can be no doubt that the water to be discharged at Bagnalstown would be 600,000 cubic feet per minute. This is not excessive, because Mr. Hession has measured at Carlow, when he thought there would be 544,000 cubic feet. That was as I knew during a very excessive flood in 1873, and probably great floods like that will be much more frequent than they have been hitherto. Now, as to the upper portion of the Barrow being a compensating reservoir in its present state, I am inclined to think it is, and of a very great extent. I could go much beyond what Mr. Manning states. He says that it is 22,814 acres with a foot of water on it, but I would say beside the part actually covered with water, you might take into account what is estimated under the drainage as soaked lands injured by the flood, which I believe is 23,000 acres. I asked the question yesterday, how much of the area of the bog of Allen was included, as the bog of Allen will, I believe, in a great measure be drained by the operations on the Barrow—at least I think so. That was the reason why I asked your Secretary, because I am not sufficiently conversant with it; but he could not tell what extent of the bog will be drained. I suppose the information will be forthcoming after a short time. But, suppose it was 60,000 acres, which would not be too high an estimate, there would be 100,000 acres of land partly flooded and partly spongy, acting as a sort of compensating reservoir to hold the floods, or at least delay their passage down until the floods of the tributaries had run off. I think with these figures and facts before you, you will see that the extent of the river below Athy, for carrying off floods, forms a very important part of the considerations that you have before you. I have, therefore, gone over the whole of

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the river, and takes soundings of it, and examined the different weirs and the means of discharging water, and would say, generally, it is well known that the condition of the river is such that it cannot discharge such a flood as 400,000 cubic feet of water a minute, below Bagnall's, without very serious flooding; and I would say even a greater flood than what I have seen indications of at present. The river varies in depth and width, but one might say that a great deal of the river is about 150 feet wide, and four or five feet deep, and that this, probably, about three feet below the land. It is something about that at Orleow. That day it is very low. To-day it is two feet four to the top of Cornwall Quay, and of course it stands to reason that the flood might come over that, and might flood the place around. Of course the thing to be looked to will be, will there be an increase of flooding by the operations proposed. If there is no increase of flooding, and if it is certain there will be no increase of the flood, we will be only left as we were before. There is also the question of the bridges, but that probably belongs more to the County Surveyor. I have taken the measurement of all the bridges the whole way down. The first bridge is, Horse bridge, and that has to be remodelled, so that it will pass the floods. That is up at Athy. Then there are many other bridges where, from the depth of water at times, rather than from the width and shallowness of their foundations, will probably have to be rebuilt—probably Leighton bridge and Royal Oak bridge, and Milford bridge. No doubt these will be found inefficient for carrying off the floods. I think this is a matter for your consideration, whether this increase of floods may send such a charge against the bridges that they would be swept away. That of course hangs on the main question whether there would be greater floods and more frequent floods than before. Besides, on the river throughout its length there are a great many islands and other obstructions to its passage. In looking over the Ordnance maps published forty years ago, I was much struck by the appearance of a number of these islands which show now in the river and which did not exist at the time these Ordnance maps were made. I conclude from this that a good deal of silt has been carried down by the Barrow, and I believe that the works will be so constructed and the channel so regulated that when the channel gets into its normal state there will be no more silt carried down than at present. But everyone will admit that in the first stage, after drainage has been completed particularly through gravelly and silty land there will be a considerable amount of silt carried down into the Lower Barrow. These islands which consist of reeds and rushes with the silt collecting on them will no doubt collect more, and therefore I think that any drainage operations in regard to the Barrow should take into consideration the clearing away of these islands. Certainly it would be a wise precaution that something should be done in the Lower Barrow for the purpose of removing even the possibility of any increase of flood or of increasing increase of damage. What these operations should be of course will depend on future surveys and examinations, but as a general rule, I think the river should be deepened and those islands removed, and there could be large sluices put in at several of the important weirs particularly at Orleow. I don't think the town of Orleow could ever be freed from flooding without these sluices, but of course if the floods are not greater there would be no need for these sluices. In reference to the navigation at present carried on through the river itself and through the canal or certain portions of it—one portion of it being canal and another portion being the river itself—I have found from observation that there is a very considerable fall or slope in the surface of the water on these reaches that appear perfectly level. There is a fall in many of the reaches of one foot in the mile, and were these falls not in it the upper part of the reaches would not be navigable. There are a good many shallows in the

upper part of the reaches and if the slope was not in the water—that is if the quantity of water was diminished to any great extent, I would say that the navigation during the dry weather in summer would be completely stopped, except the upper end of the reach was deepened to a considerable extent. I have taken the depths of the sills, and the sills of most of the locks are considerably deeper than the bottom of the canal or the bottom of the river, so that it would be quite possible without providing new locks or lowering the sills to excavate the upper part of each of the reaches, that it might be made navigable, even with a less quantity of water in summer. The question now arises, will there be as good a supply of water coming down in the summer time? I am inclined to think there will not. That seems to me self-evident, for 100,000 acres of spongy land partly flooded and partly spongy, now takes a very long time in delivering up the water and thus it keeps the water supply of the Barrow very constant during the summer. Last year was an unusually dry summer and the water certainly fell very low. I have no calculation exactly of the quantity running, but I should think that it could not have been more than 10,000 cubic feet a minute. If that were lessened in any way by the upper basin being so thoroughly drained that in fact there would be no water remaining in it as a reservoir in the summer to give a supply, there is no doubt that the quantity running down would be very much less, and if it was very much less the upper ends of the reaches would become quite shallow and in fact be rendered unfit for navigation. I therefore think that any scheme of drainage ought to include, certainly the deepening of the upper ends of the different reaches also in considering what works ought to be done—there is the question of the weirs. Some of them are not long enough, some of them probably ought to be so arranged that the mills might be lowered, but a good many weirs where there are no mills at all attached to them might be lowered at the same time deepening the bed of the navigable channel. This will be self-evident to anyone. There are a good many things that could be done and that can be suggested by me now, and which will apparently seem to any engineer examining the Lower Barrow, which in the case of flood or greater rainfall would enable it to be run off with less damage. I think, I have shown that the lower part of the river should be dealt with and should form part of the whole scheme—that any scheme dealing merely with the upper part of the river without consideration for the lower would be a very serious undertaking and one attended with tremendous risk to the interests down in the Lower Barrow. I have not gone into the expenses at all. I do not wish to speak against drainage in any way, because I am a great advocate for drainage—I believe it does not only improve the land that it applies to, but that it also improves the whole climate of the district around. I think that none of my clients desire that there should be no drainage—all they want is that their portion of the river should be taken into account and that floods should not be sent down which might be very much in excess of what they are at present, and which might cause very serious damage. There are several gentlemen who will now be examined who know locally each portion of the river and after their examination, I might have to say a few words. I shall be very happy meanwhile to answer any questions the Commissioners ask me.

2255. Mr. Downing.—Might I ask you where the point is at which you had the discharge of the Barrow at 10,000 cubic feet a minute?—I think at Bagnall's town. Mr. Crosthwaite, of Bagnall's town, tells me that last year his millwheel took about the whole river at that point, and I could not exactly make out the quantity, but I think it was about eight or ten thousand cubic feet a minute. I took a measurement of some of the weirs on the fifteenth of this month. In one case I made the water passing to be 12,000 cubic feet a minute, and at another, 14,000 cubic feet

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2390. I only want to know the point!—Well, that is the place. Mr. Brereton, a gentleman who has lived on the Little Brooma, will be examined as to an instance of how the floods are brought down more rapidly at his place. There were two tributaries which supplied the river Brooma through his place, floods came down formerly at different times—one flood running off before the other; but since the drainage of the Coalbrookdale river, the two floods came down together.

Lord Cairncross.—I think that is an incidental point that perhaps we might inquire into presently, but in the meantime we have your statement before us, and it remains first to consider how it should be dealt with—whether by any of us here asking you questions, or whether we should ask Mr. Manning to devote himself to an examination of the statement you have made, and to put any questions to you that may occur to him as regards the matter. Perhaps Mr. Manning would ask Mr. Price any questions on this subject or get any information from him he desires with regard to the statements he has made?

2391. Mr. Manning (to witness).—The first question I would ask Mr. Price then is this—you see the whole foundation of your statement is based upon the fact—whether it is a fact or not—that the flood discharged at Athy would be increased, and you apprehend very great dangers from it. Have you made any estimate of that increase?—Not at Athy. I think I said that I agreed with you to a great extent as to what would pass at Athy.

2392. Well, have you made an estimate anywhere? Well, I consider, that at Bagnalstown the quantity will probably be 500,000 cubic feet per minute, whereas, I think, that under the present circumstances, except in the case of a very extraordinary flood—such as Mr. Hauser has mentioned—that it would not be more than 500,000 cubic feet.

2393. Why?—Because, I think, that you cannot take more than half the supply of the tributaries as adding to the flood coming from above Athy. There are certain occasions on which tributaries may come together, but as a general rule they don't; and, therefore, I have only taken 100,000 cubic feet as coming from the tributaries, in addition to the 400,000 at Athy. I think, therefore, that the increase will be 100,000 cubic feet, and you will get the full flood at Bagnalstown.

2394. You stated that there are two or three other rivers—the Green, the Douglas, and the Lerr, between Athy and Carlow. Are you aware that all these rivers have been improved, and that they should according to your idea, that a quantity of water is sent down more rapidly, send down their water, and be likely to send it down before the flood from the upper portion has come?—All, except the Green, have been improved.

2395. If they have been improved, therefore, the water would come down more quickly?—Yes. I base my idea on four days rainfall, and on what Mr. Roberts, one of the Commissioners of Works, once reported with respect to Lough Erne. He gave the matter a great deal of consideration, and he stated that he thought the rain for these excessive discharges never lasted more than four days; and I am very much inclined to agree with him, for I have been observing the water since, in the Lough Erne district, and after about four days the rain generally moderates. Well, supposing these important rivers are running full for four days, or three days, and that rain takes place at the same time over the upper part and comes down a day—is it to be sometimes hours or twenty-four hours, I don't know exactly the time you calculate, in which the run-water will come down from the upper part in future; but, certainly, within the four days they would be contemporaneous. I believe, under ordinary circumstances it would take six days for all the rain to come down from the upper part.

2396. Well, we will pass from that and go on with your statement, with regard to the effect that the

flooded lands have in forming a reservoir for the floods of the Barrow. Now there is no discussion about the 25,000 acres which are actually flooded and there are nearly the same—25,000 acres which are called soaked though no flood passes over them, and you say that in a large flood you are entitled to take in these 25,000 acres. I would wish you to explain to me how it is that they can form a reservoir of any kind if they are saturated with water up to the surface—that is suppose you have a basin full of sand and pour water into it until it comes up to the surface how will you make that a reservoir for floods?—I admit it would not be if the land was saturated.

2397. Well, these lands are soaked and saturated and you claim these lands as letting out water in summer, but how can they suffer in winter floods if they are already saturated?—I don't think they are always entirely saturated—I think they dry to a certain extent; I don't think they are always fully saturated.

2398. Mustn't they be saturated as the flood rises?—Certainly.

2399. And before there is any flooding—any considerable flooding, must not these lands be saturated although not flooded?—Yes.

2400. And therefore they cannot act as reservoirs?—I cannot see that exactly.

2401. Then, with regard to the bogs—100,000 acres, if they are above the level of saturation and are spongy, will not that spongy soil remain, no matter what you do with the other land?—Well, I don't suppose the bog or what is put down for bog is entirely bog.

2402. But you have actually given the measurement, I think—you stated 104,500 acres as if by measurement; now do you really maintain that which you have put forward in respect to these bogs?—I did not say the quantity exactly, because I could not get the information. I asked for it yesterday and was not able to get it.

2403. But 100,000 acres means a general statement, whereas you gave 104,500 acres as if actual measurement?—It was only a guess. I asked the question yesterday but was not informed as to the exact amount.

2404. You say it is your certain and decided opinion, that at Bagnalstown, the river won't be capable of discharging the floods from these 25,000 acres of land being drained on the upper part of the Barrow—isn't it evident that the river is not sufficient now, and that the lands are flooded now?—It is evident.

2405. Therefore it is quite obvious that whatever course—whether the Barrow brings down more or less, isn't it flooded now?—There is no doubt, it is injured now.

2406. Then it all comes back to this;—that it depends upon the increase of the discharge of the Barrow by this drainage?—Yes.

2407. And it is merely a matter of your opinion that it will be increased—but you don't know how much?—Yes.

2408. There was one other thing that I was rather surprised about, and that was this—I travelled down the Barrow Navigation, yesterday—you stated that in some of the navigation levels there is a fall of one foot per mile in the river navigation?—Yes.

2409. Do you think that there is a surface inclination of one foot per mile in any of the river navigation between Athy and Carlow?—I have got the levels down.

2410. I would put it to you this way—you have stated, that now even, at Bagnalstown the summer discharge is only 10,000 cubic feet in a minute—if you have a channel as big as the navigable channel of the Barrow is now, and if you have one foot fall of surface inclination, don't you think that the discharge would be a great deal more than 10,000 cubic feet in a minute?—It is not 10,000 now. Take it at Belmont, below Carlow,—there the river is almost

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choked up; it is divided into several channels, the islands have choked it all up, and there are obstructions across the channel, which, there is not more than one third of the normal channel of the river.

2317. What is the state there?—Well, I cannot tell you exactly the state. I can tell you the fall, now, from Curlew lock.

2318. The fall is no good to me except you find me the cross sections as well, you know that well?—I cannot give you that. There are the falls which exist—I sometimes get six inches in the mile, sometimes one foot in the mile where there are great obstructions, and yet the navigation is carried over them. Well, with that state of things, if the water is diminished pretty much in the upper reaches, and the river is allowed to fall six inches below what it is now, I doubt if it could be used for navigation purposes at all. Some parts of it are only 3 feet 3 inches deep, and the boats can with that water only just scrape along. If you reduce that by six inches you will certainly shut up the navigation.

2319. There is only one other question—you say you apprehend the improved arterial drainage of the Barrow will reduce, in dry weather, the flow of the water—that is in summer?—Yes.

2320. Will you kindly tell me your reason for that?—My reason for that is simply, take weather like what we have had or what we are having now. I think the whole of the ground would be so dry, at periods before any rain comes on, that the first rains will be absorbed by the ground which has been drained, and that in fact experience has shown in other cases that where there has been good arterial drainage the summer water is very much decreased unless you have power to draw by sluices from a great depth.

2321. Will you give me any case instance of your knowledge of that effect?—I cannot at this moment—it is the result of my own observation, but I cannot recollect the place.

2322. Can you tell me the quantity, the time, or the place?—No, I cannot now.

2323. Mr. JOHN McKEIGHT.—Have you any personal experience of the discharge of water in arterial drainage before and after the works were completed?—No.

2324. Mr. HARRARD.—Is the 10,000 cubic feet per minute, which you state to be the discharge at Bognalston at the present time, the result of actual measurement?—Oh, no, I could not get it—I tried to get the measurement exactly, but the weir was very dirty.

2325. It is such an extraordinarily small quantity as compared with other similar districts that it leads me to ask the question?—It is from information given to me by Mr. Costikwan, who has the mill there, that I have come to that conclusion. He stated that the whole of the river last year went through the wheel of his mill, and so far as I could

calculate it would be about 10,000 cubic feet per minute.

2326. That was last year?—Yes.

2327. And you say that the drainage of the bog would be likely to decrease the supply in summer?—Yes.

2328. I have a report of the Commissioners of 1851 before me and it gives the exact area of bog, 64,855 acres—and that, you say, acts as a sponge giving out gradually during the summer; if the water was lowered two or three feet in those bogs, would not that be two or three feet of greater depth of spongy land above the water level?—Yes.

2329. And would not that increase the entire ground storage?—What I mean is this—that the whole quantity of water in the bog would be drained off much quicker. I have no doubt that it would have more sponge, but the whole quantity would be drained off more rapidly than and the bog would be in a drier state.

2330. Why would it run off the surface of the bog more quickly?—Not more than of clay. I think the bog being of a spongy nature would hold a quantity of water. It is different from clay.

2331. But would not six or eight feet deeper bog hold more water than two or three feet—wouldn't it act as a greater reservoir to start with?—Yes, but it would come off quicker if you cut through it. I think if you run a drain through a mile of a bog, although you take it at a greater depth below the surface, there would be less cubical contents of rain held in the bog than before it was drained.

2332. The storage would be greater than before?—The storage would be greater than before, but the water would get off quicker. For instance if you had a lake storing up water, and if you made a sluice at a lower level there is no doubt you would take off more water by means of that sluice—but you would run off the water in the upper level quicker.

2333. Mr. BAUM.—A point was raised about the three rivers between Athy and Curlew—the Grecco, the Douglas, and the Lerr—and the question was asked whether these three had not been already improved. Is there any gentleman here who can say whether the Douglas has been improved?

Mr. HADE.—It has not been improved.

Mr. BAUM.—I believe some works were done on the Grecco a good many years ago?

Mr. HADE.—Yes, in a few places, but not generally.

2334. Mr. BAUM (to Mr. Price).—Have you any witnesses to examine before the Commission to prove the different points which you have set out in your statement?—Yes, a list of three has been handed in. The first witness I would propose to examine is Mr. BENTON, merely for the purpose of showing the case of a river—one branch of which was drained and the other not—and where the drainage increased the floods very much.

Mr Simpson  
H. Benton.

Mr. Simpson H. Benton examined.

2335. Mr. BAUM.—Tell the Commission the particulars of the case Mr. Price has just mentioned?—I am a disinterested party giving evidence before you. I did not know Mr. Price a week ago, and I was sent for them. I am living in the place to which he refers for thirty-three years, and after the river was drained.

2336. Mr. BAUM.—Where is this drainage you allude to?—It is five or six miles from Bannalston—the Castlebernard river drainage. It comes down through the King's County. That was drained first. It used to pass my place. Then there was the Riverstown drainage—what we call the Brooma drainage. The water of the Castlebernard river used to pass by before that of the Riverstown river, before the drainage was carried out. We used to have twelve or fourteen hours between them—one passing off before the other one came. Then they drained the little Brooma

up at Riverstown and took away the mill-dam. I was near the mill myself previous to the drainage—and I was there on Saturday and inspected it and walked in the mill-race. They drained that, and then the two rivers came down together in a great torrent. They have not done anything to the lower and adjoining the Shannon, and the result is it floods as in no time. I have barked some of my calves five or six feet. Well, I have gone into that land when it was quite dry, and in two hours I have come out of it up to my knees in water. I have had my hay ready to be cut there, say to-day, and the next day I would have to go in a boat and put down poles to feed where my cows of hay were. We made a desperate struggle to get something done for that state of things through the Shannon. There was a Commission sent down, and I was examined before the Commissioners in Banagher. They wanted

to grant us £150,000 on an area of 18,384 acres in eight counties, with 7,000 in one and 500 in another. I proved to the Commissioners it was not the Shannon injured us at all but the Brooms. They valued me at £187 on 81 Irish acres. They put on a valuation of 1s. 1½d. on my land, and for the improvement they contemplated giving me they put down 12s. 5d. an acre.

2337. I think I must stop you going on with that line of evidence. It has nothing to do with what we are inquiring into. The point I have to ask you about is the flooding of the land—whether it was owing to or consequent to the deepening of this river above you?—I have brought my notebook from 1875 with me. The meadows which I set for 84s. in 1875, and in 1876 for 90s., I have lost almost ever since. In the last ten years I have got scarcely anything out of them.

2338. And was the drainage you speak of made at that period—ten years ago?—It was, and ever since the state of things has got worse and worse. Land that I set myself eight years ago for £34 was set this year for £10. Last year my son had to cut it, but it had not been cut for three years. I had before that given the grass to the country people to cut it away and make dung of it. This is only to show that as the lower part of the river was not done when the water came, it came down on us. There was one instance I know—and I have a man who can swear to it as a fact. In 1877 he paid £12 for the first acre of meadow, and I knew it afterwards to be set for £7 and £11. I walked that same land the day before yesterday. It is under grass now for little over 7s. an acre. It is nothing but rushes. It was Mr. Kinahan's property, but it belongs to Mr. Bolton now.

2339. Sir JOHN McKEOWN.—When did you first

observe this increase of floods—floods which injure you much—in what year?—It was in 1876 the Riverstown river was drained. The Castlebernard river was drained about 22 years previous to that, and lands which were set at £5 10s. an acre by the year have been cut only once or twice since in consequence of the lower end of the river not being cleared, though there is plenty of fall.

2340. But it is not the question of the lower end of the river at all. You attribute the injuries you receive to the two districts the drainage of which has been carried out, bringing down their flood waters simultaneously?—Yes.

2341. What year was the Little Brooms drained?—In 1870.

2342. The Castlebernard district drainage award was made in 1858, I think?—I am not sure. I think it was in 1870 the Riverstown River Commission set. I was examined at the Commission before the Commissioners at Athlone.

2343. That has nothing to do with the point. That Commission fell through—nothing resulted from it. The evidence which you give is as regards the waters simultaneously coming down?—Yes.

2344. Mr. BROWN.—There is a very long list of witnesses here. I might suggest it would be an unnecessary waste of time to examine all these gentlemen on perhaps one or two points. If you could select one or two, or more as the case might be, you could put forward these to prove your particular points. It might answer all your purposes as well.

2345. Mr. PRICE.—Mr. Houghton has the management of this matter, and he suggests that Sir Thomas Butler might be examined as to the increased discharge occasioned by drainage.

Sir Thomas Butler examined.

Sir Thomas Butler.

2346. Mr. PRICE.—Will you kindly state your views on this matter?—I am an interested party in the matter in consequence of being proprietor of the flooded part between Millford and Loughlinbridge, and I was asked by the Committee sitting at Carlow if I would take any part in this. I replied that I was interested so much that I believed if a large increase of water was sent down without cleansing or improving the bed of the river below Carlow, both I and my tenants would be injured—that their lands would be more deeply flooded than hitherto. I happened at the time I received this letter to be staying in the County Louth with a gentleman who had read an account of this Commission in the newspapers, and he intimated the case of a river which ran through his property. He was a lower proprietor circumstanced exactly as myself, and he informed me that he had sustained increased damage by the upper part of that river having been drained without the outfall being cleared or prepared for it. He informed me that the people there were obliged to make dams to stop the upper water until they cleared the lower water and prepared for the upper. When the floods came the dams were constantly swept away before the bottom was prepared. The cost I was informed had been estimated at £17,000, but by the time the drainage was completed it amounted to £45,000, but that the

Government only taxed the district to the extent of £25,000. That being the case, I mentioned these facts to the Barrow Navigation Committee in Carlow, and they asked me to attend here and state them. If anything I have said is incorrect, I am sure Mr. Manning will correct me. The river I allude to is the Glyde, discharging at Anagassan, and Mr. Manning was one of the engineers.

2347. Mr. MANNING.—I was, sir—and I suppose Sir Alan Bellingham was your informant?—Yes.

2348. Well, he is a great friend of mine, but I don't know whether you caught the meaning of what he said exactly. I would not like to say anything regarding what you say, but I don't think you had all the facts before you.

2349. Mr. BROWN.—I suppose what you wish to point out, Sir Thomas, is, that if the flooding in that river Glyde was caused by the drainage having been carried out in the upper part without sufficient provision being made for its discharge below, if the same course were adopted here the lower part of the Barrow would be liable to be subject to greater flooding?—Yes, my opinion is that my tenants would be greatly flooded.

2350. That is if such a thing is done?—Yes. My own idea is that the lower part of the river should be prepared for the discharge.

Mr. Frederick Houghton examined.

Mr. Frederick Houghton.

2351. Mr. PRICE.—Can you inform us what your experience has been of the floods in the river Barrow at Loughlinstown?—I live there for 38 years. In the old times we counted three days for the flood getting up, and three days for its getting down. In the last five years I have known a terrific flood to come down in 12 hours. I made inquiries, and found that this came from the Rathangan Drainage. So Mr. Tyrrell told me. I believe that is only a very small portion of

the catchment basin. In fact, the flood was up 4 feet in 12 hours. I knew that by the back-water in the tail of the mill-race.

2352. What year was that?—Oh, it was within the five years.

2353. You don't remember the exact year?—No; but, by making inquiries afterwards, I found that the flood was brought down from Rathangan Drainage.

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Mr. Frederick  
Houghton.

It came down brown and muddy, such as I never saw it before.

2354. And that was principally from Rathangan Drainage?—Yes; on making inquiry at Kildare I found that to be the case.

2355. And since that time have you observed the rising of the floods to be more sudden than before?—Oh, certainly; until the last two years, when I lived at Leixtown.

2356. Sir JOHN McKEILIE.—How were you then situated?—Between Margrady and Athy, near Taskedowna bridge, four miles from Athy. In fact, the bed of the river is utterly unable to carry off any flood. There is an island and a mill below Margrady, and as rough grass there is a fall of twelve inches between the head and tail of the island.

2357. Do you remember the date of that remarkable flood you spoke of?—I do not. It was within five years.

2358. Was it, do you remember, in September, 1791?—I could not say. It was whatever year the Rathangan Drainage was completed—it would be about that time.

2359. Mr. PRICE.—The greatest flood we had in Lough Elbow since 1679 was in February, 1831. There was a rainfall of eight inches previously.

2360. Mr. CONEELY (to witness).—Was the Rathangan Drainage finished the time you speak of?—It was only on making inquiries from Mr. Walter Tyrrell, I heard the Rathangan Drainage was the cause.

2361. Are you aware there are several stoppages between you and Rathangan?—There are only two ways—Andrew weir and Ashy weir.

2362. Do you know where the Rathangan is

situate?—I am aware it is very near Kildare. I have no personal knowledge of the river there.

2363. Mr. BAKER.—But you mentioned the time it took the flood to come from Rathangan to your mill?—Twelve hours.

2364. What ground have you for supposing it took that time?—I remember the time the rain ceased. It ceased the evening before, and the flood was down next morning, and covered over the whole of the top-path. I estimated it to be at the height of four feet.

2365. Mr. PRICE.—How long did it take to rise from the first time it began to rise?—I couldn't tell, for it happened in the night. It was the colour of the water which first attracted my attention.

2366. Mr. HARRARD.—The flood from Rathangan do not coming down quickly upon you, as you say, would first of all have to pass over the great area above Monasterevin before it would come to you?—I am perfectly aware of that. It should have gone through that lake at Clonsay.

2367. Do you think it would have flooded up that great, immense basin, and gone through the obstructing river and on to your place all within twelve hours?—I have no knowledge of the river above Athy.

2368. Then what you say is only supposition?—I made inquiries from the gentlemen in the neighbourhood of Kildare, because I saw the colour of the water was very different. I inquired from gentlemen living in Rathangan, and they informed me they were flooded since the drainage.

2369. Well, I carried out the Rathangan Drainage, and I am not aware that the water of Rathangan is different from any other water?—Well, I could only compare it to the Mississippi thick mud.

Mr. Edward T. Quilton, C.E., examined.

2370. Mr. BAKER.—I believe, Mr. Quilton, you have been directed by the Grand Jury to attend here and give evidence before the Commission?—Yes, in consequence of the uncertainty that exists as to the effect of these works, the Grand Jury asked me to state what I know of the present floods, and the capabilities of the different structures to carry off what at present comes down. Three of the bridges—the three northern ones—Milford, Leighlin Bridge, and Royal Oak—are, I think, taxed at present to their utmost capacity. An increase of the flow of water coming down would be not only prejudicial to the bridges, but injurious to the adjoining lands and roads. At present a considerable portion of the roads on the Carlow side, between Milford and Leighlin Bridge is covered in flood time. I have driven through a long stretch of it myself. The water flows over the bank on the north side of Leighlin Bridge, and at times round through the street, and if there was any increase in the height of the flood, the injury to the houses would be very considerable. The bridge at Leighlin Bridge is a very old one. It was originally a narrow bridge and has been added to, and like most works of the kind, is not well able to bear a very great strain. The bridge at Royal Oak has not been so dealt with, but it is a very much worse structure, and I think it would be impossible of being under-pinned. The water-way at Milford is narrower than at any of the other bridges. If the bed of the river was cleared at Leighlin Bridge, and the bridge put into good order, the water-way, I think, would be quite sufficient, but at present the islands that are forming above and below are rendering some of the arches entirely useless. Within the period that I have been acquainted with the river, the island on the north or up-stream side has extended considerably, and is now close to the ridge.

2371. Within your knowledge these islands are increasing near the bridges. Can you give us any information as to the lands appearing or increasing elsewhere?—No, I am not acquainted with the river elsewhere.

2372. There is a considerable fall in the bed of the

river at Milford, is there not?—There is, but for that the bridge would not be able to carry the water. The total water-way was only about 100 feet.

2373. What is the water-way at Royal Oak Bridge?—About 145 feet.

2374. What is the depth of the river at Milford?—About four feet. It is about six feet from the bed of the river to the springing of the arch.

2375. Do you recollect the flood in 1879?—The water was very high about that time, I remember. I don't know the exact date, but the water was nearly up to the eaves of the arches. If a cock of hay or the trunk of a tree were to come down, I think it would smash the bridge.

2376. Then your evidence generally is that any increase in the floods would be injurious to these county works—the three bridges you have mentioned?—Yes, and also to the roads in the neighbourhood of Leighlin Bridge.

2377. Mr. HARRARD.—It depends on the question as to whether there would be any increase?—Entirely. I did not go into that.

2378. But any thing that would prevent the dirt coming down would be an improvement?—Yes, as it swishes in the rushes.

2379. Sir JOHN McKEILIE.—Are you aware if any public record has been kept of the height to which the water has risen at the points you speak of?—Not on behalf of the county.

2380. No record kept?—No.

2381. Mr. HARRARD.—And I presume there are no rain gauges?—No.

2382. Mr. BAKER.—Oh yes, there are private ones (to Mr. L. Young). Have you not got at your office in Carlow a record of the height of the water?—Yes, at all the locks of the navigation.

2383. Sir JOHN McKEILIE.—Yes, at the time Mr. Houghton speaks of, in September, 1879, there was a rise of two feet at Berfield lock.

Mr. HARRARD.—That was two years before the Rathangan drainage.

Mr. Edward T.  
Quilton, C.E.

Mr. James Byrne, of Newtownplaworth, examined.

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Mr. James  
Byrne.

2384. Mr. BYRNE.—I believe you have some information to give us with regard to the flooding of the river near Bestfield?—I know the river between Magney and Jerusalem Bridge. I recollect the time the flood came on suddenly, that Mr. Haughton speaks of. It was raining all day, a Sunday; we had the hay cut, and I said "We will go in the morning and take the hay away—it takes three days for the flood to rise." Well, we went to take the hay away in the morning but the water was all over it. It was the first time that I knew the Barrow to rise so suddenly.

2385. Mr. CANNY.—What year?—I think it is about four years ago, but I cannot exactly say. It was four or five years ago. The place was flooded every year except last year. The meadows were not cut for four or five years except last year. We cut the hay in the end of July last year anticipating floods in August. It was a dry season, and the floods did not come down so early, but during the four or five years previously the floods came down much more suddenly than before.

2386. Mr. HARRARD.—Are the meadows you speak of adjoining the Barrow or the Lort?—They adjoin the Quace. They are between Magney and the Quace.

2387. Mr. SMITH.—Had you had much rain pre-

vious to the Sunday you speak of?—No, it was only one day's rain, and what happened was most unusual. We never anticipated such a thing, because one day's rain was never known to cover the meadows in that way. When I afterwards heard about the drainage of the river I thought that might have been the cause, but I did not know whether it was true or not.

Mr. BYRNE.—When do you propose to have examined next, Mr. Price?

Mr. HARRARD.—The other witnesses will be with regard to the flooding in Carlow.

Mr. Price.—There are circumstances connected with Carlow of great consequence, having reference to the storm of Mr. Watson and others, and I think you ought to hear the witnesses with regard to the town of Carlow particularly.

2388. Witness (Mr. Byrne).—I think the water of the Barrow is higher than the land adjoining—where your land, Mr. Brown, adjoins mine. The water throws the water up to Magney, and it is in the same level from Magney up to the weir. The water coming up to the weir is higher than the land.

2389. Mr. BYRNE.—That has nothing to do with the flooding. You say that the ordinary level of the water is above the land, but that is owing to the construction of the weir.

Mr. James Dolger examined.

Mr. James  
Dolger.

2390. Mr. BYRNE.—Do you wish to give evidence as to the condition of the town?—Yes. I have been living opposite the river all my life, and for the last few years, as Mr. Haughton remarked, I have noticed the floods rise very rapidly even when we had only little pressure of rain, sometimes in April, and when the river had been very low; and when I came out in the morning I noticed the river nearly bristling up to the coping stones. I drew Mr. Kelly's attention to it, and we spoke to Mr. Deane, who keeps the register for the Barrow Navigation Company, and he stated it rose on the sill of the lock fifteen inches. In 1881 or 1882 we had either one or two days rain, and the flood came down very rapidly. It was on a Saturday evening, I remember, that I noticed it. I message a milk-burner for Messrs. Watson Brothers, and I anticipated from the rapid rise of the water that the floors would be flooded. I had a man up all night watching the flood, with instructions that if once he saw the water making its appearance over the embankment to let me know. It came down so rapidly that we had to draw a lot of clole and softs and clay, and by means of making a sort of embankment for about thirty paces we succeeded in keeping the water out. It was not for that I am certain we would have had fifteen or sixteen inches of water on the floors. Well, I attribute that state of things, as Mr. Haughton did, on making inquiries to the partial drainage of the river up to Rathangan. From all I can learn that is an area of only about one-ninth of the drainage contemplated by this scheme to be carried out. If any further increase of water is sent down I believe the stores and malt-houses and other property there would not only be considerably injured but would be rendered useless.

2391. Have you observed an increase in the rise of the floods since the Lort drainage has been carried out?—Oh yes, they come down more rapidly. Just as Mr. Haughton said. I used to have time to consider what was to be done, to look about me. I had occasion to get the corn hopped fifteen or sixteen years ago when we had a flood. We had, I remember, a very large flood some years ago. It was running for a week, and the greater portion of the district was flooded. The water remained over in the Griffee district till it left many of the poor people who lived in that locality in a bad and delicate state of health, and

they have been so ever since. The houses were saturated with water for a month or six weeks, but still the people strove to live in them by using boards or planks in endeavouring to keep the floods out, but these poor people, many of them, slept with the water actually under them.

2392. How long ago do you say that was?—That was in 1878 or 1879, seven or eight years ago.

2393. I suppose your fears entirely arise from the fact that you believe there will be an increase in the floods?—My belief is that there has been an increase in the floods already caused by the partial drainage done lately, and that if any general drainage were carried out without making due provision for the outlet to carry it away, I believe it would seriously injure the trade of Carlow, so far as the corn and milling trades are concerned.

2394. Mr. HARRARD.—How long after the rain, on the occasion you refer to, began to fall, did you observe the water on a level with the quay. I am speaking of that particular flood?—Yes, in 1879. I think it was not more than twelve hours or so after the rain ceased. In fact it was drizzling I might say at the time the flood was rising.

2395. How long had it been raining before the flood rose to the level of the coping of the quay?—It was actually raining at the time.

2396. But how long had it been raining?—I think about, perhaps a couple of days—not more.

2397. Mr. BYRNE.—You mentioned a flood fifteen or sixteen years, and another of seven or eight years ago. In order to have you answer clear, may I ask you was there anything remarkable about that flood sixteen years ago?—Nothing remarkable any more than that it rose gradually, we had two or three days to look about us and make preparations, but the flood in 1879 rose up quite rapidly.

2398. You wish then to draw the attention of the Commission to the difference of time which the flood took to rise fifteen or sixteen years ago, and what it took to rise in 1879?—Yes.

2399. Mr. Price.—What time did it take to rise in last April?—It was only raining for a few hours, it began to rain in the morning and after a few hours rain the river was nearly bristling.

2400. Mr. BYRNE.—Do you hold any land in the

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Mr James  
Baiges.

neighbourhood of Carlow I.—Yes, on the banks of the Barrow, on the Queen's county side.

2401. And it is liable to be flooded?—Before I had it in my own possession, I have seen three feet of water in the lay there. In the flood of 1872, there

were three feet of water in the lay cut in the bottom. I was afraid to run the risk of snowdrowning it any more since, for I would have to get it cut before it would be fit to be out, for fear of the water coming.

Mr. John  
Kelly.

Mr. John Kelly, examined.

2402. Mr. BAIGES.—You have been resident for a long time in Carlow I.—All my lifetime. I recollect perfectly, the greater part of these islands accumulating along the quay. They are a great obstruction to the bridge and below the river too, all these islands or nearly all of them accumulated within my own memory. I think the islands at the quay are not more than twenty-five or twenty-six years growing. I think the first foundation for the islands was some more which were planted there directly opposite our store in the year 1804. There was no solid ground there then, but now there is a stretch from the bridge up parallel with the quay; I think, these islands more or less deprive the bridge of the power of properly carrying off the water. There are only three arches in the bridge than can carry off the water. Some of them are idle—one from the abutment of the old bridge, and another from the island being in front of it. I was well acquainted with the poor people of Grimsay, for a number of years, and I know how much they suffered from floods. For about a mile and a half on the Grimsay side there are bottoms which are protected from the Barrow getting into them by embankments, but when the flood breaks into this low lying land, it fills up like a pond. From the town of Grimsay up to Knockbeg bounds, which is about a mile and a half. The water has to get away through sewer about two feet square, and it takes about a month to get away after the river subsiding. The result is that a great many of the houses have been allowed to fall, for the people would not live in them. Sickiness broke out in 1862. There were over 100 persons died from the cholera in that district. I know ten, fifteen or twenty cases of fever after the September flood of 1879, in that particular district. In fact the state of things there, as such, that it increased the taxation of the division from 1s. 5d. in the £ per-acre to 2s. 10d., just double. And a great deal of that was attributable to the floods.

2403. Are you afraid of an increase in the floods if these works are carried out?—If the river increased in magnitude, we may shift away from the margin of it.

2404. What is the ground of your supposition that the floods will be increased by the proposed works?—It appears from what I have read that it now takes a fortnight or three weeks for the floods to come down, and that what it is proposed to send that down in thirty-six hours. Surely that must increase the flooding.

2405. Have you observed any increase in the floods lately, since the carrying into effect of small drainage districts?—Yes, my business made me observe these matters for the last seven or eight years, since 1878. And every year the floods are increasing very much in the rapidity with which they rise—a flood gets up as much in a night now as it used to rise in a day and a night or in two days.

2406. You spoke of the islands forming near the quay at Carlow. Do you know of any new islands having been formed in the river elsewhere?—No, but I am aware of others increasing in size. Opposite the Steady-hills the island has increased very much. A mile up from the town opposite where they get bricks the whole river is more or less filling up. For an English mile below Grimsay I think the river has decreased in depth two feet within my recollection. Where there was a swimming hole with six feet of water, within my own knowledge, owing to the sand coming down the river, there is only a couple of feet of water now.

2407. That is below where the Barrow falls into the Barrow?—Yes. There was an observation made by Mr. Manning at the commencement of the proceedings to the effect, that in heavy floods the weir is hardly perceptible. I can confirm that, but it is easy to explain it—for the land is choked in behind the weir like the neck of a bottle. If preparations were made behind the weir to allow the floods to go free, and if the bridges and the islands were cleared away we would never be troubled with floods in or near the town.

2408. That would be a heavy expense to go to, to clear away the bridge?—Oh, I speak of the islands only.

2409. You consider that the islands forming before the bridges obstruct the water-way very much?—Not only that, but they send the water into different channels, and these channels select their own arches. If the water were kept in one channel it would be better, and if behind the weir were cleared it would carry off any quantity of water.

2410. Mr. BAIGES.—Have we now finished the evidence to be given with respect to the town of Carlow?—

Mr. HAUGHTON.—The only other witness would be the borough surveyor, who could give general testimony as to the flooding of the town.

Mr. BAIGES.—I think we have confirmatory evidence upon that point, and I don't think it is necessary to examine any further witnesses with respect to it.

2411. Mr. Percy Le Touche.—Mr. Kelly's evidence refers to the islands forming within twenty-five years. Well, our experience (that of the Barrow Navigation Company) does not confirm that, we could give evidence to the opposite effect.

Mr. PRICE.—There are some twenty islands not shown on the Ordnance Map.

Mr. Le Touche.—We have maps made in 1811 which show the islands.

2412. Mr. Kelly.—I came down the Barrow in two of the highest floods that have ever been in it. I came down at a time the towing path was all submerged, and at every place where these very islands were the water was driven over the banks, even the tow-path, and all over the country. It was quite easy to see what was causing the obstruction to the water.

2413. Mr. BAIGES.—You say, Mr. Price, there are islands now in the river which are not marked on the Ordnance Map?

Mr. PRICE.—A great number.

2414. Mr. BAIGES.—If Mr. Le Touche would compare that map with his own map there might be some explanation of the discrepancy. It is an important fact that islands now existing in the river's course cannot be found on the Ordnance map. Surely one of the six-inch scale maps marks anything in the shape of an island.

Mr. Le Touche.—There are some places above the bridge of Carlow called islands which are really beds of sedge. Mr. Kelly speaks of them not having existed twenty-five years ago. We have evidence to show that they existed forty years ago. Mr. Kelly says they were caused by "saline" being planted there. How could saline be planted there unless there were islands there?

2415. Mr. PRICE.—The island above the bridge at Carlow is not marked at all, and there are three islands within half a mile below Carlow not marked at all on the Ordnance map.

2416. Mr. Frederick Haughton.—They were caused by the Barrow drainage.

2417. Mr. BRUCE.—I think you refer to the island above the weir, Mr. La Touche?

Mr. La Touche.—Yes, above the weir.

2418. Mr. BRUCE.—I think Mr. Kelly's observations applied to those below the weir.

Witness (Mr. Kelly).—I spoke of these both above and below. I can only speak for thirty-one or thirty-two years. I think in 1834 there were salices planted, and then there was only a little speak of mud to be seen

in a very dry summer. But all these have accumulated since.

2419. Mr. Haughton.—It is only fair to the Barrow Navigation Company to say that I have an old map here, made in 1832, and there are three islands marked south of Carlow—between Carlow and Belmont. They are small, but they are marked.

2420. Mr. La Touche.—They are very small now.

2421. Mr. Haughton.—And they are not marked on the Ordnance map.

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Mr. John Nolen.  
Rely.

Mr. James Butler, of Leighlinbridge, examined.

Mr. James Butler.

2422. Mr. BRUCE.—Do you live at Leighlinbridge? —Yes; I am the partner of Mr. Watson in the Mills here. We have very considerable concerns there. I have not been there very long myself, but Mr. Nolan can tell you a great deal more about the river than I can. All I can say is, that if the floods rise six inches more than they have done since I came there they will do an immense quantity of harm. If they were to rise for only five minutes six inches more than they have done, they would destroy £2,000 worth of barley besides other things. There is a bridge there,

but no water can go through the principal arch owing to the mts. In April the water was very low, but it rose from fifteen to eighteen inches in a few hours.

2423. During your experience have you ever had a flood which came into your stores there?—Not in my experience.

2424. But you were flooded within six inches of the water coming into you?—Yes, within six inches of it. We have recently laid out 28,000 in building there. That would be utterly ruined if six inches more of water came on us.

Mr. John Nolan, examined.

Mr. John Nolan.

2425. Mr. BRUCE.—Can you tell us about the floods in Leighlinbridge—have you during the last few years observed any alteration in the floods?—I have been in Leighlinbridge since 1837 or 1838. At that time there was no obstruction to the traffic of the boats. Now the river is nearly closed up. There has been a considerable increase in the islands at both sides of it. As has been observed by the County Surveyor, these islands have closed up—they have been accumulating year after year, and the result is that the village has been destroyed. At the time I speak of, 1838, there was a very good town there, but Leighlinbridge is now a village. Since the railways have been opened in the country it has not been at all what it was. If these islands were opened and cut away, the water would not rise so much. It would give an outlet at the lower end of the bridge, which is choked up entirely. There was always an open in the little

island, near the church, to let the water off, but that is now closed up and has become land. Unless that island is cleared away it is impossible to have an outlet for the water. I believe there is not a bridge on the Barrow in more danger than Leighlinbridge. If the island above the bridge closes more, the bridge must be carried away. I have noticed since the works were done on the River Barrow the water has increased considerably. I have built a store there myself, and if I thought there would have been any increase in the flooding I would never have gone to any expense there. Mr. Watson, who is the life and soul of the town, has gone to great expense in building there. If the traffic were taken away, of course the trade would be destroyed, and it would be an enormous loss. Before you bring down any more water you must have something done to enable the water to be carried off.

Mr. Edward Crosthwaite examined.

Mr. Edward Crosthwaite.

2426. Mr. BRUCE.—Kindly mention what evidence you desire to give?—I think I can say something about the rise of the water in the Barrow after the drainage of the Barrow. We have a private bridge from our mills to the farms on the opposite side of Bagnalstown, and after the Barrow drainage was completed, we found that this bridge was liable to be carried away by any flood, so that we had to raise it one foot. I am not certain when the Rathangan drainage was completed, but I noticed in the last two heavy floods the water has touched the lower beams of the bridge, even after we raised it one foot, so that we in times of flood have to be long out all the weights we can to prevent the bridge being carried away. From what I heard this has only occurred since the Rathangan drainage was carried out.

2427. You speak of heavy floods?—In 1873 or 1879; and the last heavy flood was two years ago. Of course we are all agreed that everything depends on the rising of the water over former levels. If the water should rise six inches or a foot above its present level at Bagnalstown, there is no doubt the mill banks would go, and the mill premises and house would be flooded; and, of course, the mills would suffer very severely from back-water. No doubt arrangements would have to be made to carry the tail water lower down than at present—for instance, through a separate arch to some distance below the Royal Oak Bridge. It is not alone that we apprehend the high winter floods, but

also low water in summer. Now, last summer the whole of the river, except what was necessary for the navigation, passed through our waterwheel. We had just enough for our purpose. If that water were reduced of course we would be obliged to have recourse to steam engines to carry on our work. With regard to the large island situated between us and Royal Oak Bridge, in my own recollection it has increased at least fourfold; and a good deal of that increase is attributed to the Barrow drainage, and the deposit which has come down from it.

2428. You speak of the possible loss of power to your mill in summer from the drainage works?—Yes.

2429. Have you found any such diminution of power owing to the Barrow drainage works? Do you think you have lost any water in consequence of these works?

—It is beyond my recollection, but I should not apprehend so much loss of power from the drainage of the Barrow as from the proposed works, because the Barrow comes from a different sort of country to that you now propose to drain. These lands are in Kildare and the Queen's County, and they soak any quantity of water in the winter, which coming down to us gradually in summer, keeps the mills going. We know ourselves that the Slaney and Kilkenney rivers, coming from a different soil, are almost dry in summer. We fear the same with regard to the Barrow, should the proposed works be carried out, and the basin which now filling in winter forms a reservoir in summer

July 25, 1898  
Mr. Sewell  
Crossed-off.

be dried up; also if the navigation were affected in any way, the loss to the country would be enormous. We ourselves pay over £3,000 per annum to the Navigation Companies alone for freight, and many others pay as much or over more.

Mr. Watson.—All our stuff is carried over the navigation.

2430. Mr. BAILEY (to witness).—You are acquainted with Baginshawtown?—Yes. I don't think the town itself would be injured.

2431. Is there a lower part of the town?—No; the land rises from the river to a higher level. We have a good deal of land flooded. The great obstruction below us is the Royal Oak Bridge. When the water reaches that place, it cannot extend as it does when passing our mills, and it is obliged to pass through the arches of the bridge, which I believe is quite unable to bear any more strain than at present.

2432. Mr. HANMER.—You say the water was very low last year?—Extremely low.

\*2433. Have you any idea what the depth was?—I

gave some measurement of it to Mr. Price this morning, and he considered about 3,000 cubic feet passed through the mill-works.

2433. How many pairs of stones were you able to work?—We have sixteen sets of rollers at present, two pairs of flues, and six pairs of stones.

2434. What is the fall of the wheel?—About 11 feet.

2435. And what was the fall of the water?—About 11 feet. The fall of the lock is 10 feet 7 inches. The fall of the wheel is a little more than that.

2436. And what do you say is the diameter of the wheel?—The diameter is 22 feet, and the width 16 feet.

2437. You were able to work the fourteen rollers at the time you speak of?—Yes; we never had to stop the mill at any time, but we had to throw out the screening machinery once or twice last summer to allow the boats to pass, the river being so shallow. Had no flooding would be, we think want of power in summer would be even worse.

Mr. Patrick  
Maier.

Mr. Patrick Maier examined.

2438. Mr. BAILEY.—Do you propose to speak of the river below Baginshawtown?—Yes, at Gorsebridge. I know the river for a great many years, and I remember distinctly the two floods spoken of—one in 1879, and the other in 1881. I knew them to remain on the lands about there for three weeks. A portion of my own land, about forty acres, was covered over for nearly two weeks. There were a lot of poor people just inside the town in 1881, very badly injured by the flood. I saw a cat plying from one place to another carrying the people to Moss on Sanderg. I attribute this state of things, in a great measure, to these islands. There are two or three islands which are just convenient to the bridge, with rushes and other stuff growing up there obstructing the water, which then flows up on to the track line, and into the lands. The poor people of Gnatgas have the same grievance.

2439. Do you think the flood has increased of late years?—I never saw it greater than these two floods. It might come and remain a day or two, but on these two occasions it remained for a long time.

2440. You live a very long way down the river. Do you think that any alteration in the flooding has been effected by the drainage of the tributaries a long way up the river?—I come to the conclusion that gave more freedom above will drive the quantity of water down quicker, and consequently we will suffer more below. I could not say the length of time it will remain with us, but it will spread over our lands more. Portion which has escaped flooding up to the present will, I have no doubt, if more water comes down, be covered.

2441. That depends on the question whether the water will come down at a higher level than it did before?—Certainly, but we are disposed to think the more freedom the water will get above, the more effect it will have on us.

2442. Mr. Price.—The secretary of the Barrow Navigation Committee wishes me particularly to call your special attention to the reach of the river between Lowthdown and Magney, at which point the old weir is exceedingly bad, and the soundings very small. I have got our soundings in the river itself here. The river is about 160 feet wide—it may be 110 feet wide, and we have made a number of soundings. Here are some of them—8 feet 4 inches, 3 feet 6 inches, 3 feet 4 inches, 2 feet 8 inches, 2 feet 4 inches, 3 feet 2 inches, 2 feet 3 inches, 2 feet 2 inches, 1 foot 10 inches, and at one place under the bridge it was only 1 foot 6 inches deep.

2443. Under which bridge?—At Tankardstown bridge I have 1 foot 4 inches and 1 foot 8 inches. I have about one hundred soundings in that particular reach, and I say there is danger in sending down floods into that river, when the channel Mr. Manning

requires for his drainage above Ashy is 160 feet wide by 9 feet 5 inches in depth. Here we have a channel of only 110 feet. I refer particularly to the reach of the river from Magney down to the next lock. (Shows the locality to Mr. Manning on the map.) There are some little spots here and there, deeper. We have one 5 feet 5 inches, and another 4 feet 4 inches, and so on; but I would say that the average would be about 3 feet. The width varies from 110 feet to 180 feet. The fall I could not give you there.

2444. Mr. Manning.—There is no use in giving me these soundings except you give me the surface inclination?—Well, then I cannot give you.

2445. Well it is quite without result to talk about the action of the river with regard to the discharge, without giving the surface inclination. It is waste of time to talk about it—I beg your pardon, upon that point I entirely differ from you. Most of this river is very flat, and there is a weir at the head of it. At the weir there is a sudden fall. If there was a uniform slope from the head of the weir for the two miles, by taking the whole fall to the lock, whatever it might happen to be, five feet, perhaps, you could calculate then what that river would discharge. There is, as I say, a sudden fall at the weir, and then the river goes through the flooded land parallel, with very little fall at all. At any rate, I know sufficient about the river to say that that channel, and a great many other channels are utterly inadequate to discharge the present waters, and the proof is that the lands are flooded. I may say also, that the gentlemen who desired me to speak on their behalf, are very anxious that the drainage should be carried out for the general good, provided that their interests are looked to, and that there is no experiment tried on them beforehand. They think that before anything is done, that the lower reaches of the river should be taken into account, and that the works shall include the complete preparation of the river for the reception of floods that may occur to a great extent. Every one knows that if there was a flood of 500,000 cubic feet per minute, and if you only had a channel for a volume 100,000 cubic feet less per minute, it will be utterly inadequate. It will take a great deal more than one-fifth more fall if you attempt to force that additional 100,000 cubic feet per minute through. If you try to force that additional water through the inadequate channel, you will not only have a rise in proportion of one-fifth, but it will be a great deal more, and the danger would be far greater than people are aware of. The head required is not in the simple proportion to the flood.

2446. The increase in the head would not be in the ratio of the ordinary fall of the surface. That is to say, if you only have a fall of two inches in the mile, and if you wanted to get twice the velocity, you should make it 8 inches, and the result would be only a rise

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Mr. Patrick  
Mahan.

of 6 inches in a great flood which discharges double the quantity. Therefore it is not right to say it would increase it so much—I said it would increase it in greater proportion.

2447. Is it not the mean hydraulic depth that is increased?—Yes.

2448. And therefore the velocity would increase?—Yes.

2449. And therefore the comparison you would make now is one that you and I would like to enter into by ourselves—I did not say what the proportion is, but the whole nature of drainage depends on that—that is one, another way—when you make a large channel you diminish the fall very much—you diminish the head-water very much more than the more proportion to the channel.

2450. It would be more satisfactory if you would give the inclinations in the channels—for otherwise it is hard to go into this?—It is only another way for saying that it would be a very serious thing to increase the flood at all.

Mr. Manning re-called.

Mr. Manning.

2452. Mr. BARNES.—Will you kindly give that explanation?—As I before stated this is a question of degree and speaking merely upon general principles, you must acknowledge that to take any quantity of compensation reservoir from a river at all will take away so much of the compensating power—that is, as I before said—if you pour a bucket of water into the sea you would be compelled to say that the level of that sea was raised. It is all a question of degree, and it can only be settled by actual facts. My experience has been that the floods would not be increased by such a diminution of the compensating power of the river as would be represented by 25,000 acres! With regard to it having any effect at Baginbown or the lower part of the river, I don't believe that to be the case. Then with regard to the frequency of the floods, I think every engineer will acknowledge that as matter what works are executed in a river, the total yearly quantity of water that comes down that river will not be increased or diminished by those works. Here again is a question of degree, because if you send water down quicker you have a little less expenditure and it will be an improvement more than anything else—but it won't be a sensible improvement—you cannot perceive it. I don't pretend to go closely into the question of the discharge down here, because I never saw the Barrow down here until yesterday, but what is the fact? I have stated the maximum discharge to be about 400,000 cubic feet per minute, and I believe Mr. Price and other engineers agree with me pretty nearly. I have stated that it probably won't be more than 250,000. Then what is the mean discharge—that is every drop of water that goes down the river from year's end to year's end. I have found ten years' experience of the rain at Tullamore to be twenty-eight inches, and the evaporation I know from long experience and observations of my own, varies in Ireland from eleven inches to nineteen inches. I have taken it here to be fourteen inches. Calculating that over 400,000 acres, you will find that the mean discharge will be a little under 10,000 cubic feet in a minute. In other words about one-tenth of the maximum discharge I have calculated. Now, we come to the maximum discharge. From various observations made by Mr. Bateman in England—by myself in this country—and by other engineers who have been able to observe the quantity of water in dry seasons, Mr. Bateman has found it to be twenty cubic feet off a 1,000 acres per minute. I have found from series of daily observations made in the North of Ireland for two years, the evaporation went down to eleven inches. I have got evaporation going up to nineteen. Well, taking it all at twelve cubic feet per minute off 1,000 acres, twenty Mr. Bateman found to be above the average dry weather volume—that is the conventional name we have for

2451. Mr. BARNES.—The whole question we are inquiring into here turns on the hypothesis whether there will be an increase in the water or not owing to those drainage works? Whether the floods will be to a greater extent and more frequent? More frequent flooding would certainly be an injury to some of the property you represent, but not all. More frequent flooding would not occasion any difficulty or damage to the malt stores Mr. Watson holds. It might do so to the mills and navigation, and it might do so, and probably would do so, to the farms along the banks; but I repeat, the whole question turns upon the probability or certainty whether there will be higher or increased floods, and Mr. Manning holds a different view from you, Mr. Price, on this subject. My brother Commissioners agree with me in saying that it would be more satisfactory if Mr. Manning would now explain to those present the grounds upon which he forms his opinion that there would be an immense either in the height of the floods or in the frequency of the floods owing to the drainage works proposed.

It) that would amount to 8,000 cubic feet per minute for the summer discharge at Carlow. Mr. Price said it was 10,000 cubic feet farther down, and I rather agree with him in that. Well, now we come to what that would amount to at Carlow. Taking a very rough way of measuring, the horse power—we will say that practically one horsepower is equal to 740 cubic feet of water per minute with 1 foot fall per minute. Well, that would give for the mean discharge at Carlow, not less than fifty-seven horsepower per foot of fall—that is if you stored all the floods and applied it all to the mill power, but if you take the summer's discharge at 8,000 cubic feet you will find it will give you between ten and eleven horse power per foot of fall. That is what I call the mill power of the Barrow at Carlow. Although I have long experience in milling, I must confess that I this day for the first time saw a four mill in which the manufacture was carried on by rollers, and I never spent a pleasanter or more instructive hour in my life. Mr. Shackleton's mills are a credit to the town. I found that the fall of the lock is about six feet. I measured it to-day at five feet eight inches; but they informed me that they had the sole of their wheel raised above the flood, therefore they have not on the wheel a fall of six feet—probably it is four and a-half feet or five.

2453. Mr. Mansington.—Carlow lock is under five feet.

2454. Mr. Manning.—I took the measurement from the surface of the water.

2455. Mr. HARRISON.—Carlow lock is under five feet.

2456. Mr. Manning.—I measured three feet four inches on one side from the first board and I measured nine feet to the bottom.

2457. Mr. HARRISON.—There is a nine inch board at the weir?—Yes.

2458. Mr. Manning.—Yes, I took the difference between the two waters to-day—the difference between nine feet and three feet four is five feet eight. When I say that I speak of the surface of the water which was measured by myself in the lock. You were quite right in saying the fall of Mr. Shackleton's mill is not that. He probably could not get that, I could not get down to the sole of his wheel to measure it. But let us take it at four feet or five—if you take it at five feet, it would be fifty-five horse power. And what do I find, that he had a high pressure railway engine which he was working up to fifty-five horse power. Probably, it would amount to about thirty horse power to-day; and his miller told me that that was nearly rather better than the water-power he had to-day, which would give him about the same; so that was sixty horse-power he was working to-day, and the calculation I had previously made was about fifty-five

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horse-power. I mention this because I think the miller should be considered, and that there should not be any injury done to their property, and to show that the miller had nothing to do with the maximum floods, except they injure him by the tail water. He has nothing to do with the mean discharge of the Barrow, except he has reservoir capacities enough to store it all; but what he has to do with is, the standing summer supply. He cannot change the size of his wheel every time the flood changes, and he must so construct his wheel that it will, at least, not be idle in the summer season. I don't know whether there is anything else that I should say, but, in speaking before the Commission, we have not been tied up by the usual limits which we engineers place for ourselves. I think I may say this, that whatever differences of opinion there may be as to the effect of the drainage, they have been all stated before the Commission, and if one of us differs from the other, you are the judges to say who is right. If you want any more evidence you know where to get it. If you believe me, I tell you that the drainage of the Barrow may be effected by the works I propose. If you believe Mr. Fitzgibbon, it would be a possible thing to have it carried out. If you believe the very able medical men, who came forward and gave evidence in a sanitary point of view, they tell you that these works, along with being profitable, will make the homes of the people more healthy and happy. If you believe all that, it would be for the Commission to judge whether the scheme should go on or not. I am glad there has been no contention here at all. There has been merely a number of persons gathered together having different views and different interests, to see what was best to be done, and I don't think it was selfishness, though some people might call it selfishness on their part to come forward here. I think it was a proper defence of particular interests in a general matter. Now, for instance, I believe that the fault in cases such as the present is, that everything seems to have been deferred to the permanent interest. At one time it was all for mill-power. At another time it was all for navigation. Now it is all for drainage. To narrow it will be to something else. But I think that was a bad solution of those questions, that all other interests should cede to the permanent one, and that in fact we should act in accordance with modern philosophy, and say the proper course is the survival of the fittest and to kill everything else. I don't believe that you should kill the navigation, or kill the mill-power. It is not because the navigation has not been recently profitable that you should kill that, nor the mill-power—because it is almost extinct in this country—that you should kill that. The time may come when the waters of the Barrow may be used for power, which might be stored or transferred to distant points. I have nothing more to say.

2405. Mr. HAMMOND—You mentioned the rainfall at Tallanure. Have you got any record of the maximum rainfall for the year?—Not here. I think I gave that evidence in Dublin.

2406. Sir JOHN McKEELEN—With reference to the increase of the discharge, your opinion is that there would be no increase in the discharge beyond the present amount of the floods in wet weather. The other point which has been so much dwelt upon is the probable or possible diminution of the summer flow of water. There are one or two points on which you may perhaps enlighten us a little. The whole district is a very flat one— isn't it?—Not all of it.

2407. With the exception of a small portion of the north-west?—There is part of it flat and part of it hilly.

2408. But that being the case, and regarding it as a flat district, excepting that small portion, would not the result be that the flow of the water would be very slow?—Yes, that is during floods through the flooded part it would be slow, and in a precipitous part it would be quick.

2409. I presume that the physical feature of the

district is one of the grounds on which you base your opinion that the maximum discharge would not be increased in floods?—The ground upon which I base my opinion that the maximum discharge would not be sensibly increased is this, that the small quantity of land to be relieved from flooding would be so insignificant with regard to the whole area of the catchment that it would not give any sensible increase to the discharge.

2410. Have you at all estimated the amount of rainfall. Now, taking an inch and a half in 24 hours, how many inches rainfall would be sufficient to flood the land to its ordinary maximum?—I have not been to such calculation, but it is easily made and can be handed to the Commission.

2411. You could give me off-hand information as to that subject. Would you say it would be more than 24 hours after the rain had fallen—would you say the lands would be flooded within that time, assuming that they are already up to the peaks of their ordinary level?—I could not give any off-hand information on that subject.

2412. The top of the whole district is at Berr?—Yes, at Athy, Berr, and Monasterevan.

2413. Assuming the obstructions are lowered at these points, and setting aside the injured land—that would drain all the flooded land to a depth of four feet—would it not?—Yes, except at the commencement of the district, where the land is very narrow, and there it would not be to advantage, I think, to discharge the maximum floods without embankments. You will see the embankments marked at the low reach of the river above Athy.

2414. But supposing the power of drainage is reduced to a depth of four feet, would not that give a capacity for holding up water to that depth, assuming the land to be of a porous or moory nature?—Undoubtedly.

2415. And would not that to a considerable degree compensate for the loss of flood water?—Yes, sensibly—the increased run and depth of the river, and lowering of the surface of the water during floods, would give a quantity, but I won't say how much, over the whole length of the river—as much in fact as the river's course would hold.

2416. But the relieved lands being of a porous nature, would they not take up a very considerable quantity of water?—There is no doubt also that all arterial drainage—that is, deepening under the surface of the land—will give a greater reservoir, so to speak, by draining lands which are dried. If these lands are saturated as at present, you have a constant water surface on the level, and it is impossible for you to hold any water on them, but if you drain them you will have two, three, or four feet as a reservoir.

2417. And these lands taking up that water would give it out by degrees in a dry season?—Certainly.

2418. And therefore contribute to the increase of the summer supply?—I have no doubt at all upon this, that all thorough drainage and arterial drainage would increase the low summer supply of the river. In my mind there is no doubt of it.

2419. And that is one of the grounds, I presume, on which you say the summer supply would not be diminished?—Certainly, not that I think it, but I tell it you as a positive scientific fact.

2420. Is that the result of your experience with regard to drainage districts which have been lately carried out?—That is the result of my experience for nearly 40 years of drainage of every kind. There is one subject that I did not speak of at all, and that is in regard to the formation of the mounds in the river. Mr. Haughton very properly called attention to the fact that the Ordnance maps had not these mounds in them, whereas the earliest map belonging to the Navigation had them; and therefore there was no proof that the carrying out of the works in the Barrow or Rathangan would have caused them. But you must remember that the whole Barrow is a canalised river, almost level except in floods, and that there must be

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a deposit. If you allow it to continue year after year without clearing it you must expect a deposit.

2476. Mr. Selger.—With reference to a remark which Mr. Manning has made, to the effect that the drainage will improve the water power in summer, I beg leave to differ with him. I have experience of that at the mills at Barron Bridge. Before the Barron drainage commenced it could work nearly the whole day. Since the Barron drainage the mill has been half the time idle during the day, while we are collecting a pond at the very door, so that instead of improving the water power, we are only able to do half the work that we used to do formerly.

2477. Mr. Price (To Mr. Manning).—Supposing after the drainage was done the whole ground was saturated. I mean that whatever fell on the land was passing out through it, which will be the condition in which it will be after continuous rain, won't every drop of rain that falls on the surface come into the river underneath, when the land is saturated?—Yes.

2478. Supposing there was an inch and a half of rain in twenty-four hours, and it rained for twenty-four hours and found its way into the channels, what does would it be in Carlew?—I could not tell you that, or name of us could tell you that.

2479. Within a day?—I won't make any absurd guess. You give me a quantity of rain—say and a half inches—falling on a varied surface, a varied description of soil, and you ask me what time it would take to go through that surface at different depths, and then arrive in Carlew, it is impossible to answer such a question.

2480. But you said that all the rain which fell would go into the channels?—In time.

2481. And that what falls on the top would come underneath—that so much as falls would come into the river itself?—That is an absurdity. It will only occur when there is no evaporation and no absorption.

2482. I kept for many years evaporating gauges for taking both water surface evaporation and land absorption underneath, the latter was on the surface of a tank buried in the ground. My experience was this, that after the land got thoroughly dried, it took three months rain generally before I could get a drop at a depth of eighteen inches down, the land absorbed so much. That had reference to a want of summer water late in the autumn when the land is well drained it will absorb a great quantity before a drop will come into the river at all. Upon the other part of the experiment I found that when the land was once saturated—I kept a rain gauge alongside—the water ran out underneath almost as fast as the rain fell. Therefore I came to the conclusion that when the land is dried or thorough drainage carried out, so will diminish the summer water, because ceasing after a long period of drought, the first rains will be absorbed by the earth. The earth takes up an immense quantity of water, and then after heavy rain takes place for any length of time, so much as falls on the surface comes in underneath, and the well drained land will bring down the water very rapidly into the well drained river. Now, what I wish to point out to Mr. Manning, is that these tributaries with a catchment basin of 200,000 acres now send down their water at an earlier time than the Upper Barrow; but what would be the effect when all comes down together. It seems that at present the flood at the Upper Barrow takes five or six days to come down. I really don't know whether that is a fact or not. But what will be the effect when both the floods of the main river and tributaries come down together. Supposing the grounds are saturated—after February rains—and if additional rain came on, that rain will come down so

rapidly, that the tributaries will not have time to run off their water before it meets the other, as at present in the case?—First, as regards Mr. Price's experiments, I should be very glad to see them. I am quite certain they are very carefully conducted. But Mr. Price and every engineer is aware that Dr. Dalton was a good experimenter, and that Dr. Dalton differed from myself and others, and that one of the greatest disputes among engineers is with regard to the way in which such experiments as Mr. Price has made should be carried out. Then with regard to these tributaries, I mean the tributaries below Athy.—He asks whether in any season, the Upper Barrow water would not come down fast enough to meet the waters of the lower tributaries before they had time to run off, the evidence generally being that the lower tributary floods run off before the other. I don't believe so, because take the tributaries in the upper part, and I have stated this in my report—the immense fall in these tributaries and the small fall in the Barrow itself—I have provided for large channels above Monasterevan from the foot of these tributaries coming on together.

2483. I mean the tributaries below Athy altogether. The question is what means will we give to those upper tributaries when you get them down at Monasterevan?—I think they would be pretty much as they are now.

2484. Mr. Price.—I admit that I don't think it will make much difference with regard to the upper tributaries.—Then you conclude that.

2485. I don't think the flood will be greater at Athy?—You don't think the works will increase the maximum discharge at Athy?

2486. I think not.—That being the case it is ending the whole question—that is that we shall not send more water from Athy, where we cease our works, than at present.

2487. Mr. Price.—My contention is that you will send it more frequently. The extent of the flood at Athy I won't say will be greater than at present, but I will say this that the flood did not come until the tributaries below Athy had run off, and that the mischief will be done down there—the mischief will increase the further down you go—for you are not taking any more drainage space there, though you will deliver the same floods in quicker time. There are a great many things that a person cannot be certain of—a calamity might happen—and things ought to be guarded against. I say you ought to guard against an apprehended injury when it is so serious a one—because often spending half a million of money on the Upper Barrow it would be a dreadful thing to find that the improvement in the upper part of the river had caused injury to the extent of half a million in the lower part. That would be rather too good—so that instead of being merely of opinion that such a thing would not happen you should be absolutely certain that it won't or can't happen, and we should get the benefit of the doubt by having all provision made.

2488. Mr. Barry.—Is there any other evidence to be offered to us to-day?

2489. Mr. Groothuis.—I wish merely to corroborate what Mr. Price and the other gentlemen have stated. There is no desire for furious opposition on the part of the Barrow Navigation Committee. So far from there being any opposition, they would be glad to see the improvement proposed in the upper river carried out, but we think that that should be done without injury to the people below.

2490. Mr. Harist.—You only want to protect interests that might be possibly injured?—That is all.

The Commission then adjourned to the 7th August.

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FRIDAY, 7TH AUGUST, 1885.

The Commission met at the office, Le Touche's Bank, Dublin, at noon.

Present:—Lord CASTLETOWN (in the Chair); the Right Hon. HENRY BRUCE, D.L., Sir JOHN McKEILLIE, K.C.B., Colonel GARDEN, D.L., Mr. R. HARNARD, C.E., and Mr. CARRIDY.

The Secretary, Mr. PENNY, was in attendance.

Mr. Penny said:—I have some correspondence to read. The first letter is from Mr. HARNARD:—

\* Drumaire, County Leitrim,  
20th July, 1885.

"Sir,—I write on behalf of Miss Ryder whom I represent to say, that she objects to any scheme for draining the Barrow which will place any additional charge on her lands. The judicial rents have been fixed on her property, and there is, therefore, no possibility of raising rents to meet any charge for maintenance of drainage."

"Your obedient servant,"

"G. HARNARD."

The next letter is from the Messrs. Townshend, who are here to give evidence to-day. It is as follows:—

\* 15, Molesworth-street, Dublin,  
21st July, 1885.

"Barrow Drainage Commission—General and  
Mrs. GALE."

"Dear Sirs,—With regard to your letter of the 6th inst., enclosing schedule, we have examined the same setting forth the land marked as affected by floods on General GALE's property. It appears that the total area of flooded and injured land in A.D. is 54a. 3r. 32p., of which 27a. 1r. only is upon the property of above. We anxious to point this out. Ballyvaughan is no longer in the possession of General GALE, but has been sold to Mr. R. WILKINSON, 17, Russell-street, Dublin."

"Fidelity yours,"

"TOWNSEND."

"P.S.—Of course we offer no opinion relative to the proposed amendment at present."

Lord CASTLETOWN.—You say the Messrs. Townshend are here to be examined to-day?

Mr. PENNY.—Yes, my lord. Next, I have the return from Mr. MENNING as to how far the high floods in the Barrow affect the tributaries—for what distances up:—

\* Office of Public Works, Dublin,  
July 26th, 1885.

"Sir,—In reply to your letter of the 15th inst., I beg to say, that the distance of high floods in the Barrow River affects the discharge of the tributaries for the distances stated below:—

	Miles.	Chains
Finnery River, . . . . .	2	30
Kilkeny River, . . . . .	1	30
Ballyvaughan River, . . . . .	—	63
Strickally River, . . . . .	—	49
Trillick River, . . . . .	2	30
Owens River, . . . . .	—	60
Rygle River, . . . . .	4	50

"I am, Sir, your obedient servant,"

"RENDER MANNING."

The next letter has reference to some inaccuracies which have been already corrected in evidence:—

\* Keshore, 22d July, 1885.

"Sir,—In the Schedule of flooded and injured lands which has been forwarded to me I notice that Captain CROSBY's name is put down as being proprietor of the following townlands—Ballyvaughan, Big Bog, Trillick, besides others. I beg to state that Ballyvaughan and Trillick townlands belong to Lord Lanesdown, and Big Bog belongs to Lord Castletown."

"Yours very truly,"

"J. TOWNSEND TOWNSHEND."

The next letter was addressed to Mr. Commissioner Smith and sent on by him to me.

Lord CASTLETOWN.—Is that from Mr. Charles Champ?

Mr. PENNY.—Yes; as follows:—

\* Coolgogga, Rathfriland,  
July 16th, 1885.

"Bamphrey Smith, Esq."

"Dear Sir,—As one of the Commissioners appointed to inquire into the Barrow Drainage and its tributaries, and having got a schedule about it or a notice of the meeting held at Philipstown on Wednesday week last, the 6th, on making inquiry I am told that my land has been returned by the Engineers as having sixty acres flooded and forty-five acres damaged by the floods. If such is the case I do object paying for any more than is flooded or subject to flood, and the amount subject to flood is thirty Irish acres and ten damaged by the floods; and beyond that all is thoroughly drained. The land flooded I am willing to pay 3s. per Irish acre for drainage, but beyond that it would not be worth more to me. Asking you to explain the matter to the Commissioners at next meeting and oblige."

"Yours truly,"

"CHARLES CHAMP."

Isaac Champ was referred as the owner of Coolgogga, and the schedule was sent to him, but I wrote informing Mr. Charles Champ of that, forwarded another copy of the schedule, and intimated that his objection would be noted. This (produced) is the return furnished by Dr. M. HARNOLD, of rainfall:—

The rainfall at Portlinton for 20 years, from 1865 to 1884, both years inclusive:—

	Inches		Inches
1865, . . . . .	43.843	1875, . . . . .	31.289
1866, . . . . .	39.710	1876, . . . . .	38.545
1867, . . . . .	39.061	1877, . . . . .	36.661
1868, . . . . .	38.895	1878, . . . . .	30.034
1869, . . . . .	39.050	1879, . . . . .	38.443
1870, . . . . .	38.138	1880, . . . . .	38.452
1871, . . . . .	38.315	1881, . . . . .	32.965
1872, . . . . .	37.721	1882, . . . . .	37.553
1873, . . . . .	39.520	1883, . . . . .	30.758
1874, . . . . .	39.116	1884, . . . . .	34.511

Next, I have a letter from Dr. Burke as follows:—

\* Withaker's Hotel, Boulevard de Waterloo,  
Brussels, 4th August, 1885.

"Sir,—I have the honour to acknowledge the receipt of your communication of the 30th ult., forwarded through the Local Government Board Office, requesting my attendance before the Barrow Drainage Commission on the 1st inst., with reference to which I beg to report you will be pleased to inform the Commissioners that I am away on leave of absence granted by the Local Government Board since the 1st inst. for the benefit of my health, which I trust will place me in sufficient season at this occasion for my being unable to appear before the Commission, which I deeply regret, though I sincerely do doubt but that they have obtained an amount of information which will enable them to arrive at the conclusion that the confining of the Barrow cannot but exercise a very harmful influence upon the sanitary condition of the several towns through which it passes, more particularly those of Moateville, Portlinton, Mizenaverry, and Culver as specified in a special report of mine made to the Local Government Board, I think, in November, 1883."

"I remain, Sir, your most obedient servant,"

"Y. H. BURKE."

\* Medical Inspector, Local Government Board  
for Ireland."

August 1, 1885.

Lord CASTLETOWN.—That refers to the town of Portlanning?

Colonel CARMICHAEL.—To Mountinlick, Portlanning, Mountinlick and Carlow—to all the towns except Athy.

Lord CASTLETOWN.—Have we got that report?

Mr. PERRY.—I think I have got a memorandum of it. I have received some further letters from the Barrow Drainage Committee, but I need only read the last.—

\* Carlow, 4th August, 1885.

"Sir,—I am directed by the Barrow Drainage Committee to inform you that at the meeting of your association to be held in Dublin on Friday next, Mr. F. H. Norton will give evidence respecting his property in Mullin and elsewhere along the right of the Barrow. Mr. Norton will give evidence as to discharging summer water since the last drainage, and James Boyce will testify as to discharging summer water in Boyce's case drainage of that river. Mr. Price will attend and give some important engineering evidence, which was omitted at the Carlow meeting, 29th inst.

"I am, sir, your obedient servant,

"JAMES KELLY, Secretary."

I have also received the following letter:—

"6 Leinster-street, Dublin, 6th August, 1885.

"Dear Sir,—With reference to the proposed drainage we beg to say on behalf of Mrs. Gratian Beller, for whom we are agents, that while ready favourably to consider the scheme so far as it affects the lands in her occupation, she cannot accept any responsibility as regards the lands in the occupation of her tenants, who hold as a risk under judicial agreements for 14-year terms. They alone will derive benefit from the discharge of their lands, and therefore it is not reasonable that the cost should be charged to them, and level drained from them without throwing any responsibility on the landlord. We notice a slight error in the schedule—the township of Cappelton does not belong to Mrs. Gratian Beller.

"Yours faithfully,

"J. K. Stewart & Sons."

Lord CASTLETOWN.—Mr. Manning wishes to make a few observations which it would be well to hear, perhaps, before we proceed with the evidence of witnesses in attendance.

2491. Mr. R. Manning, C.E.—In the first place I should wish to mention that if the Commission so directed, I would propose to undertake an examination of the Barrow river from Athy down to the end of the navigation. But if I am asked to do that I would require a copy of the evidence given before this Commission so as to enable me not to miss any of the salient points. Another thing that struck me very much during the hearing of the evidence of the last two days—at Athy and Carlow was this—I found that there were general statements made on the part of interests, and very important interests, all disclaiming any desire to stop this work. That was the position,

the invariable position, to all these statements, that they had no wish to prevent this drainage scheme being carried out, but everything they advanced was apparently against the project, or rather made in that direction. Mr. Brown was in the chair, and he asked me to get information from Mr. Price, C.E.—It was something in the light of a cross-examination, although I did not wish it to appear so at all; I only wanted to get the information. Now the effect of that is this—that as to some of the engineering points I brought before Mr. Price, they now come today prepared for a discussion upon; but, with your leave, I would merely ask such questions as from their answers would give me to know exactly what the parties mean. I would propose nothing more—no disputation as to what they say, but merely as to what they mean. And I would also suggest this, if I might be permitted, that it would be a proper question to ask Mr. Price and others in that interest: "You say you don't object to this drainage scheme, you think it a very proper work to carry out; but you are of opinion that it will injure your interests: what would you require to be done to safeguard those interests—works to be executed, and if so, what works, or compensation to be given?" That would, I think, be a most proper thing to ascertain.

Mr. BARRY.—I quite agree with Mr. Manning in that last point, and I intended, if the opportunity offered, to ask those gentlemen, or those who represented them, what they would propose to do to guard the interests which they were defending. The supposition is that those tenants and others on the lower river would be injured either by too much water or too little water coming down, and I proposed to ask them if they had any suggestion to offer to the Commission which would, in their opinion, safeguard their interests in the event of the works being carried out; and whether it would take the form of additional works—protective works—or whether it should take the form of compensation in case the protective works would be found to be impossible.

Mr. Manning.—Is that as far as the Barrow navigation is concerned?

Mr. BARRY.—No. Beyond that there are many interests. There is the milling interest, there is the agricultural interest, and the interest of the dwellers in the lower parts of the town, who might be affected by the increase of the floods. That is more of a sanitary question however.

Lord CASTLETOWN.—At number 3 in the Warrant there is reference to that matter. The words are that we are to inquire whether the works will in any way injuriously affect the Barrow Navigation, or the lands below its down-stream limits. The milling interests would come in there too, so that this comes entirely under our powers, and hence out the Warrant.

#### Mr. Charles Unwin's Townland examined.

2492. Lord CASTLETOWN.—Mr. Townshend, I think you have some evidence to give the Commission as to the valuation of lands scheduled—Well, so; it is more as regards boundaries. There are some across I wish to correct.

2493. As regards boundaries?—Yes.

2494. Well, would you kindly state to the Commission, please, what the boundaries are you refer to?—I sent a tracing to the Secretary, which probably Mr. Perry has.

2495. What County do you refer to?—King's County. I thought the best evidence I could give would be the tracing, which shows exactly what are the boundaries.

2496. Whose lands are you interested in, Mr. Townshend?—You will find them set out on page 2 of the Schedule for the King's County, but the name is given wrongly—"Col. Guy;" it should be Lieut.-General Guise, &c.

2497. Lord CASTLETOWN (to Mr. Thomas Fitzgerald,

C.E.)—Would you take a note of what Mr. Townshend is about to direct attention to, please?

Mr. Fitzgerald, C.E.—Mr. Townshend has already furnished me with this information, my lord, and I have noted it.

2498. Mr. Townshend.—The second townland in the list, Ballinavon, had been the property of General Guise, but it was sold—sold not long since, and I have given the name and address of the purchaser to the Secretary—Mr. E. Waldron, 17, Emerald-street, Dublin. That the third townland, Stenmore, was never ours.—

Mr. Brown.—No, we had evidence already that that belongs to Major Armstrong.

2499. Mr. Townshend.—Then the remaining townlands—Down, Agnewville, Gorteenard, Ark, and Clonyquinn—are all right; they belong to General Guise, except in the case of Ark, where he is charged with the whole townland, while he only owns portion of it. I had the quantities taken out on the Ordnance map,

Mr. Charles  
Unwin  
To-attend.

August 2, 1899.

Mr. Charles  
Unwin  
Townsend.

and can give you the accurate measurements. We are charged with 88s. in 30s., but of that all that we actually own is 27s. 1s.—the rest, I think, belongs to people of the name of Clarke.

2450. Lord CASTLETOWN.—That will be noted. And now, in your opinion, are the figures put down for the probable increase in the present actual value of the lands when drained and improved, correct?—Well, if we are to be charged for the improvement we don't dissent to the proposal at all, except as regards lands in our own hands.

2451. You protest against being charged for lands in your tenants' hands?—Yes, most strenuously.

2452. We have had protests of the same kind before, and we only want to know your opinion?—General Guise strongly protests against any such charge being imposed upon him in respect of lands held by his tenants.

2453. But as to lands in his own hands, the valuation you consider is fair?—I did not go into the question, because it seems to me we are charged with lands that would not be benefited. A narrow strip of land—Down, Aghevilla, and Gorteenard. The area is not large, but still I should object to the charge unless it was shown that we could be benefited. I have been able to drain that land sufficiently already—in my opinion.

2454. Is it near the Barrow or on a tributary?—It is near Gortehill.

2455. On a tributary?—Yes. The townland of Ard would probably be benefited somewhat, and there is one townland in which we have a large quantity of bog in hand—that is Glanquin.

2456. That contains 251 acres?—Yes, and I think as regards that probably the estimate is about fair. I have not gone very closely into it, but that townland will benefit—it is near the town of Portlough. As regards lands in the hands of tenants, however, I would enter a strong protest against our being charged in any way for the prospective improvement, as I am not aware of any way in which we could be rescued, or how we could derive any benefit whatever, owing to recent legislation.

2457. Is there any other matter you wish to mention?—No, I think not.

2458. Mr. BRYAN.—Mr. Townsend, you said that one of your two reasons for objecting to the charge was that you were able to drain the lands yourself?—Yes.

2459. You object because, as I understood you, there is a sufficient fall to drain the land independent of the arterial drainage which we propose to do?—It is pasture land, and I would not through drain it if we had the opportunity. By severing the stream we have sufficient fall for all our purposes.

2460. Sir JOHN McKEE.—Are these lands put down as flooded, or only as injured on the map?—Only injured—coloured light.

2461. They are coloured green, and not blue, on the map?—Yes, light green.

2462. Green—not black?—Yes, except in the lower part, it is coloured blue—(after looking at map)—No, I find that one part is coloured blue. It is the part that we have sold, and have nothing to say to what is coloured green. That part is coloured blue—darkish blue, which, I presume, means much flooded; but I have not seen it flooded once, and I know the land these twenty years and more.

2463. Have you sufficient outfall at present for the drainage you speak of?—Quite sufficient for our purposes. But as I have said one townland would be improved by the scheme. The other townlands I don't wish to see interfered with.

2464. But, as I understand your evidence, the townlands in your own hands ought not to be charged either for the prospective improvement, because you can drain it yourself with the present outfall?—That is so, except one townland—Glanquin—in which there is a considerable amount of bog land, and that will be improved. No doubt Glanquin will be improved by these projected works—considerably improved. There is a large extent of bog—cut-out bog and deep bog on hand—and for that the charge put on is a fair one, we think. But we have also in the same townland a number of tenants, and we strongly object to paying for other people.

2465. Mr. BRYAN.—You don't object, then Mr. Townsend, to the scheme as a whole, and as a probable means of benefiting the district?—No, on the contrary I think it is a work that is very much required at present, very much required. But, on behalf of the owner, who can never participate in the advantage, I object—as far as the lands in the occupation of tenants are concerned—to the charge being placed upon him.

2466. But, supposing that the improvement of the lands by this drainage, renders your tenants better able to pay their rents than they were before, do you think that that would not be any ground for making some charge to the proprietor?—I don't myself see that any advantage is likely to arise to the landlord from that—not to General Guise.

2467. But I put it hypothetically—not as applying to any particular case?—That is if the rent that the landlord can get is better secured, ought he not to contribute towards the expense of securing it?

2468. Yes?—Possibly there might be a small percentage put on for that, but the charge inheres not upon the landlord for such works is out of all proportion, and if the present scheme was to be worked on the old basis, I would totally object to it, because circumstances have, as we all know, completely changed of recent years. That is the only one element of advantage to the owner that I could possibly conceive to arise—the additional security of his rent. But my experience is, that where a landlord has laid out money he has suffered for it rather than otherwise.

Mr. Thomas  
Fitzgerald.

Mr. Thomas Fitzgerald, C.R., re-examined.

2469. Lord CASTLETOWN.—Mr. Fitzgerald, the Secretary will give you the letters of various gentlemen who have written saying that they disapprove of the valuation, or that the boundaries are wrong, or that the wrong owners are returned, and so forth; and I suppose you will go down and inquire into those matters on the lands, as soon as you can.

2470. Mr. Fitzgerald.—Yes, my lord, in about a fortnight later I propose going over the entire land again—when I put a list of the objections—and examine everything, and then I hope that I may be able to get the people to attend. Because, on going over this for the preliminary work, people on one half of a townland would tell me that the floods came up to their very doors, while people in adjoining holdings who were afraid of being taxed, perhaps, said they never saw a flood near there, and it is impossible without sections,

and among the lands and the state of the flood, to say absolutely what valuation should be put on. I will do that, but meanwhile will you allow me to apologise to your lordship and the Commission for my absence on the occasion of last sittings. As you are aware from my communications, it was a most unfortunate circumstance that prevented my attending, not on my own account personally, but in the Munster Bank affair I was appointed one of the committees for the Leinster shareholders, and their interests having been entrusted to me with three or four others, I thought it would be a terrible betrayal of those interests, if I withdrew. As a matter of fact we have been meeting daily from an early hour until eleven o'clock at night.

Lord CASTLETOWN.—On the part of the Commission I may say that we are very sorry indeed that you have

had so much trouble in the matter to which you refer. Of course, as you will be able now to make the further examination in the light of the evidence received at our local sittings, the work entrusted to you by the Commission will not suffer, it will be the more complete in fact. I may assure you that we all condole with you very much.

2471. Mr. BARNES.—I am just going to make a suggestion. Would it not be possible to give the several parties interested, notice of Mr. Fitzgerald's return to the heads? The Commission will remember that there was a suggestion made that that should be done, and it would appear that Mr. Fitzgerald would get great assistance in his work, if notice was given to the proprietors, so that they, or some persons on their behalf, might attend and point out anything that he wishes to see.

2472. Lord CASTLETOWN.—I think the best thing would be to authorize Mr. Penny to send down notice and have it posted—after arrangement with Mr. Fitzgerald—that he would attend at certain points, central points, on given days, so that parties interested might meet him, and give the necessary information.

2473. Mr. Fitzgerald.—Yes, but I would suggest that you should leave the dates to my own judgment, because Mr. Penny might not know the days that I could attend. But I would communicate with him, and arrange dates beforehand, in sufficient time to give ample notice to the parties below.\*

2474. Lord CASTLETOWN.—Very well; you made no valuations below Athy at all?—No.

2475. No valuations of any kind?—No.

2476. Or of any interests of any kind?—No, not below Athy—for this scheme; I did, however, for private parties.

2477. But not in connexion with this scheme?—No.

2478. Sir JOHN McKENLIE.—You informed the Commission, Mr. Fitzgerald, that your valuation, both present and prospective, was calculated by yourself, without any reference whatever to existing rates?—Yes.

2479. You divided, I see from the maps, the several townlands into plots?—Yes.

2480. One, two, three, four, five, six, and so on?—Yes.

2481. Do those represent the different qualities of soil?—Yes.

2482. Then what would be the first quality represented—number 1, the lowest classed would, I assume, be the worst sort?—Oh, the numbers have no reference to quality at all—the numbers are only for reference between the schedules and the maps.

2483. In what way?—If I had one of my books and corresponding map here, I could show you. (Book and map produced.) The numbers opposite fields or portions in my book correspond with the numbers on the maps (points to corresponding numbers.) They have no reference to special classes of land—they are merely separating the different classes.

2484. Lord CASTLETOWN.—Flooded from injured, do you mean?—No, but the qualities. No. 1 is valued at 3s. an acre, No. 2 at 4s., No. 3 at 12s. 6d., and so on—the numbers have no reference to the qualities, they only show on the map the quantity that is valued by me at 3s. an acre, or at 6s. an acre, or at 12s. 6d. an acre, and so on.

2485. Sir JOHN McKENLIE.—But these plots represent the different qualities of land?—No, the different patches.

2486. Supposing that there are three qualities of soil—I presume there are several qualities—but the lowest quality that is the quality of least value, poorest soil, on what basis have you calculated the present value or the prospective value of that?—I have put down what I considered the present value of the land as I found it, to an occupying tenant, and then if relieved from water and enabled to be drained I made an estimate as well as I could of what I considered the future value would be—when those works would be

carried out—and that is put down as the “probable increased value.”

2487. But taking the first quality that I have referred to—supposing it to be merely soil, and that it is now flooded you regarded the present products of the land as of some quality—inferior quality?—Yes.

2488. And then by removing the water you assume that that quality will be improved?—Certainly.

2489. Would it require any outlay, beyond the mere removal of the water to obtain that degree of improvement?—I have not included any further outlay in my calculations.

2490. Your figure then is the immediate direct benefit?—The immediate direct benefit.

2491. Lord CASTLETOWN.—The direct benefit on the removal of the water?—On the removal of the water, and on the injured lands being able to be thoroughly drained.

2492. Would there be any means—it is perhaps a theoretical question but I should like to know—of valuing the land in zones as it were?—I think my lord you spoke of that before.

2493. Yes I did, but perhaps you have turned your attention to the suggestion direct?—Well, it could be done of course, but it would be very tedious and very difficult to work out.

2494. But I mean would there be any means of valuing in that way—say take as a first zone the lands lying along the river's bank, then a second zone higher up again following it along the tributaries, then a third zone for still less injured lands; going up from the source of the floods so to speak, would there be any means of valuing the lands relieved and benefited in ascent?—It would be possible of course, but difficult and most tedious.

2495. It would be a more general mode of valuation I should think?—It is on the principle of contouring—I know what you mean; but it would be very tedious.

2496. But it would be feasible you think?—Oh, yes, but tedious.

2497. Still it would be feasible?—Yes, but most difficult to carry out.

2498. And would it give you at all an approximate value of the amount of improvement?—I don't quite understand the question.

2499. I will show you what I mean—suppose there is a strip of land along the bank of the Barrow which is continually flooded, and that above that there are lands considerably injured from flooding, and further inland still a third class of lands only slightly injured, would it be possible to show the increased value by zones—in the flooded, the considerably injured, and the slightly injured by zones?—Yes, but the lands would be divided into plots.

2500. I don't mean that they should be divided into plots, but take them in zones?—I don't think you could get a zone of any length of uniform value to work it in that way.

2501. It has been done in England, I know?—I have not heard of it.

2502. Sir JOHN McKENLIE.—It would be quite possible no doubt—if the country was divided into zones beyond the actual flooded lands according to the elevation—according to the different heights to note them on that basis?—Oh, it would be possible of course, but it would be more tedious.

2503. Lord CASTLETOWN.—Why should it be more tedious than valuing in plots, *prima facie*, I would say that it would be less tedious—I have had no experience in that way my lord. Perhaps Mr. Hannes knows.

2504. Colonel CANNON.—I don't see why it could not be done?—Oh, I have no doubt that it could be done but as I say it would be very tedious.

2505. Lord CASTLETOWN.—I am only asking whether it could be done—getting it to your experience as a valuator whether it is feasible or not?—I have had no such experience and never heard of it until you mention it now.

\* See Appendix.

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Mr. Thomas  
Fitzgerald, &c.

Sir JOHN McKEBIE.—It would be complicated—*you could not get aside the reference to quality as well as the area in which it would be, you might take them both together. That is somewhat on the rating system.*

Lord CASTLETOWN.—How is that rating done—is it done by valuation or how?

Sir JOHN McKEBIE.—It is done by contours.

2506. Mr. Fitzgerald.—Rating by heights would be very fallacious.

Lord CASTLETOWN.—The reason I asked these questions was this—we have a variety of lands and interests to deal with; on the actual banks of the Barrow we have lands that would be very highly improved if the water was taken away—what I call calow lands—go beyond that again and you have lands that will be less improved relatively to these lower lands.

2507. Sir JOHN McKEBIE.—These are the lands now coloured green. (To witness).—But you propose to subdivide the lands coloured green?—Yes, I have already done so; they are not all charged at the same rate.

2508. Lord CASTLETOWN.—But you think it would be feasible to value these lands—to charge them for the prospective improvement in some as I suggest?—It would be possible, but it would be very tedious. Of course it would involve valuing by heights.

2509. Heights or contours?—Yes; and that would be very fallacious because you might have two hills the exact same height, and one would be double the value of the other—the soil varies so much. It would be very fallacious to go and value by heights.

2510. It would be very fallacious you think?—Yes, very.

2511. But not if you were valuing by ascent?—As I understand, valuing by ascent means taking a strip along the river's bank, then a strip above that and so on, but in one of these inland strips you might have two hills of the same height—150 or 160 feet—the one of very excellent land, and the other of poor gravelly soil. That is not a system I would adopt in valuing.

2512. Colonel CAMBER.—In your evidence at a former meeting, Mr. Fitzgerald, you stated that you did not take into consideration the benefit to towns from the drainage works?—No.

2513. And you stated, I see, that as regards Athy, only the outskirts of the town would be improved, and that in Monasterevan the water does not come into the town at all; now, the evidence given before the Commission at our local meetings by medical men and others went to show that the towns are very much injured in every way, and would not it be fair that they—the towns—should pay for all this improvement?—Oh, certainly.

2514. You made no calculation of that?—No, I said distinctly that I confined my valuation only to the lands.

2515. Yes!—And I left the state of the towns to the medical officers and others.

2516. Have you included the bogs adjoining flooded lands in the area to be improved, as a rule?—No, only one district, that is the Red Bog, near Athy.

2517. Oh, only that bog?—Yes, it is held by three or four owners, I think.

2518. Lord CASTLETOWN.—And what about the bogs at Puffinblown?—Well, they are not used to such profit as those near Athy. The Red Bog supplies other owners, and is very profitable, comparatively speaking.

2519. I think Mr. Harvey mentioned some bogs here?—Yes, there are Lord Droghda's, portions of Red Bog.

2520. That is the same?—Yes, the Red Bog, and Mr. Verschoyle has another part of it. There are three or four owners, I think, in all.

2521. Mr. BROWN.—There is just one question I should like to ask you arising out of Sir John McKEBIE's examination. How did you gain your information of the present value of the land—did you

dig the soil and the raised in the centre of each field?—No, I saw the sections in the ditches and dykes. It is not necessary to dig the soil and subsoil to come at the present value of the land.

2522. But in arriving at each particular value of plots did you either dig and examine the subsoil or obtain a section of the soil?—From the ditches and dykes—yes.

2523. Now, would it not be possible that a single plot might vary considerably in the quality of its land, and how would you obtain that valuation and the average of the whole plot unless you dug at different points?—Oh, I made a sufficient examination of the soil to take a fair average of each plot I marked on the map. You have every facility for doing that when walking over the lands. There are drains made by the occupiers to let off the water where they could; surface drains, and you see the soil and subsoil from these and from the ditches and dykes.

2524. But you gained your opinion of the value of the land from an examination of the soil and subsoil?—Yes, certainly, soil and subsoil.

2525. Sir JOHN McKEBIE.—One other question, perhaps you can answer it. Is there a large portion of the soil of the district of a marshy nature?—Yes.

2526. Is it generally?—Well, the majority of it is.

2527. Mr. HARRIS.—You give in your report the total amount of flooded and injured lands as 45,641 acres. Could you separate from that the land that is flooded, covered with water?—I have done so in my report.

2528. I could not find it in your report. I am aware that Mr. Manning gives it as 23,000 acres.

Mr. Manning, &c.—Yes, it is nearly half and half—half flooded and half injured from floods.

Mr. PEECE.—In Mr. Fitzgerald's report the figures are given separately for each county.

Mr. HARRIS.—Oh, for each county. Then we can abstract the figures and get at the totals I want.

2529. Mr. Fitzgerald.—If you will turn to page 6 of the report, Mr. Harris, you will see what the Secretary refers to. Queen's County—"The quantity of flooded lands is 8,893a. 1a.—the present value so much and the estimated increase so much—and then you have, "the injured lands contain 7,189a. 1a. 10r."

2530. Mr. HARRIS.—Take the county of Kildare?—Yes. (Reading).—Flooded lands contain 6,611a. 0a. 7r.; their present annual value is £3,889 15s. 6d., their probable increase in annual value is estimated at £2,310 5s. 5d. The injured lands contain 10,013a. 2a. 15r.; their present annual value is £3,247 4s. 7d., and the probable increase in annual value £1,265 15s. 5d."

Yes—I see I can get at what I want by abstracting and adding these figures.

2531. Lord CASTLETOWN.—You can take out from your figures what the probable increase in the actual present value of the flooded lands in this area will be?—Yes.

2532. And one can abstract or divide that from the probable increased value of the partly flooded or injured lands?—Yes, the two are given separately for each county in my report.

2533. So that you could begin my sum thereby by taking the flooded lands one sum and the injured lands a second sum?—Yes.

2534. And the partly injured lands a third sum—that could be done?—Yes.

2535. Out of your actual valuation, now?—Yes, it could.

2536. In point of fact, you have two sums already mapped out in figures in your report?—Yes, but in my books the lands are subdivided into plots, upon which I put different valuations.

2537. I would like you to look at the map and see what I mean—it may be only a theory, but I should like you to understand what I am at—there is, for instance, part of the land extremely flooded just above Monasterevan that, being drained, would be immensely improved—turned into fine meadow?—Yes.

2538. That and similar lands would be one zone; then inland the next strip is subjected to occasional flooding, and the third strip is injured, each representing another zone. That is my theory. Perhaps you would look into it, for I attach importance to this—I will do so.

2539. Colonel CARTER.—In the table of estimated cost in the cost per acre only for the work done in the tributaries or ditches is included the works in the main river as well?—Oh, both.

2540. Taking the whole?—Taking the whole; but I don't go into the cost of the works at all, you know.

2541. Sir JAMES McKENNA.—Have you any idea, Mr. Fitzgerald, of the extent of the bog lands in the district which you have not included in your valuation?—No, not accurately, but I could ascertain if you wish.

2542. Did you pass over it?—Yes.

2543. And look into the quality of it?—Along the verge of it I did; but on my second visit, if the Commission requires it, I can easily ascertain that more exactly.

2544. Could you say whether it is of a quality that will admit of being planted extensively—this bog land? I can't say, but I have not seen any successful bog planting yet—unless the bog is nearly cut out.

2545. Colonel CARTER.—Exactly; if the bog is cut out you may do something?—Yes.

2546. Lord CARTERBURY.—When you go over the

ground again I would like to know—and I am sure the Commission would like to know—if there is any bog land, clean high bog, now that could be drained, so drained as to enable it to be cut down to the gravel soil, because then that soil becomes, in my experience, very valuable farming land. The great difficulty in all turbary work is that you cannot cut down deep enough, that is what we are now suffering from at least.

2547. Mr. Fitzgerald.—You must have eighteen inches or two feet of bog-turf over the gravel to make good land of it. Of course if it is a clay subsoil, you don't require so much, but if it is a gravelly subsoil, you want about two feet of turf left.

2548. Lord CARTERBURY.—I don't agree with you; one foot of turf is sufficient in my experience. But will you make the examination, and see how far back the drainage works would affect property of that description, and how far back gentlemen owning turf could drain their bogs in order to work them down to the bottom. You see what I mean?—Yes. But this difficulty may arise—some of these bog lands are valuable for turbary, and what are you to do with the stuff you cut away?

2549. Of course some would be valuable for turbary; but then you value these bogs at a much lower figure?—Yes; that could be done of course.

2550. Colonel CARTER.—I think you valued the bogs included in the schedule at 1s. an acre?—At 6d. an acre only.

A Deputation attended, with Mr. J. Price, C.E., from the Barrow Drainage Committee, Carlisle.

Lord CARTERBURY.—Gentlemen, are you represented by Mr. Price at all in this matter, or do you wish to be examined individually, because we would like to meet your views as much as possible.

Mr. B. P. Norton.—Mr. Price, I think, represents us principally here.

Mr. J. Price, C.E.—My Lord, there are three gentlemen here who were not present before, unless

and members on the Lower Barrow, Mr. Norton, Mr. Browne, and Mr. Watson, who have something to say on the subject of this inquiry.

Lord CARTERBURY.—Well, if they would select which gentlemen should begin and give us his statement; that would be the best way of carrying on the business.

Mr. B. P. Norton examined.

Mr. B. P. Norton.

2551. Lord CARTERBURY.—Will you proceed to state what you have to say on the subject, Mr. Norton?—I have the mill at Strangestown, Milford, and am also proprietor of the Milford mill houses, and also of mill houses at Bagenalstown. I am very much interested in the proper navigation of the river Barrow, and that it will be, especially, made available for the carrying business. For the last two years it has been going into very bad repair, and we all feel, as traders, that if this scheme goes on it may injure it to an extent that it would be absolutely valueless for trading purposes.\*

2552. That is the Barrow navigation?—Yes, the Barrow navigation. I am now nearly thirty years connected with Bagenalstown, and last year the boats won't take more than half the loading from April out, either up or down. As regards Strangestown mill, I am much interested in it, because if there be increased flooding that mill will be stopped by back-water, and if the floods were to rise to any appreciable extent beyond what they have been in the habit of doing, the mill itself would be flooded. And as regards the mill houses which are connected with the old mill of Milford, they even barely escape now with the high floods.

2553. The mill houses?—Yes; they hardly escape now in the high floods. They have to put coals along the weir and dam when a high flood is threatening to come down, so it happens now that they generally have notice of that two or three days before, because it does not rise suddenly, as it inevitably will do if this work is carried out. These mill houses would be perfectly useless at certain times of the year, and the injury would be very serious, the mill in process might be all destroyed by one flood in a night.

2554. Is there anything else you wish to mention?

—There is a complete stop now between Bagenalstown and Carlisle in the river.

2555. What is that owing to?—It is owing to a silting up in the navigation course in consequence of the quantity of stuff that has come down in later years from the upper drainage. Above Leighton there is a great difficulty, sometimes they cannot carry more than twenty tons per boat at given periods, when the river is low.

2556. Anything else?—No, nothing else, except what you may hear from Mr. Price on our behalf. He has taken the levels, and will give you the scientific and practical details of the experiments he has made.

2557. Would you allow the Commission to ask you any questions, Mr. Norton?—Oh, certainly, my Lord.

2558. Mr. BAKER.—There is a considerable fall in there now in the river below the Milford mills?—There is a fall, but it is not at all so great a fall as below the Bagenalstown mills. I don't know exactly what it is. What is it, Mr. Price? Can you tell?

Mr. Price.—Yes, I will look for my figures as to that—the fall at the Milford mills.

Lord CARTERBURY.—Is the fall caused by the Navigation Company's weir?

Mr. BAKER.—No; the fall I refer to is in the natural bed of the river. (To witness)—Isn't there a great fall in the natural bed of the river just below the Milford Mills?—No, not a very great fall.

2559. Mr. Price.—Just at Milford there is. I took the fall of two or three inches—and that is one of them—which I will be able to give you presently.

Mr. BAKER.—Perhaps Mr. Price would give us that fall now as we are on the point?

2560. Mr. Price.—Just as you please. There is a

\* See Appendix.

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fall from Milford to the next lock at Leighlinbridge, a fall on the surface of the water in the river, for there is no reach of the canal in that part. That is two and three quarter miles of a stretch, and the fall is one foot and a tenth per mile.

2561. Lord CARMARTEEN.—That is below Milford?—From Milford lock to above Leighlinbridge, a distance of two and three quarter miles, and the fall is one foot and a tenth per mile. I can give you other particulars about that if the Commission so desire. I took the fall in other reaches as well.

2562. Mr. BAILEY.—On that point. Does not the fall that you speak of on that reach nearly all occur close to the upper part of it, close to the Milford mills?—Oh, no. There is a fall just at the bridge, and —

2563. Yes, below the bridge?—Yes; there is a fall there, but this is spread pretty much over the entire reach. There is a little bit of a fall just at the bridge, and quick water through the bridge, but I should say that the fall I have quoted is pretty equally divided over the reach of two and three-quarter miles. At least I have given the average of the fall spread over the whole reach.

2564. Following up that question. Do you consider that that fall is not sufficient to prevent the strong-stream mill from being stopped by backwater in the event of floods occurring greater than have hitherto occurred?—Certainly not. I have made a calculation in reference to that, having taken the average depths throughout of that reach. It is four feet in the navigation, the deepest part of it, and it averaged about three feet six inches across the river; the width is 180 feet; the height of the land was about three feet over the surface of the water when I took it, and that channel would discharge with that fall, when it was just overflowing, about 161,000 cubic feet per minute.

2565. Would you make that answer a little clearer? Do I understand you to say that taking the river to be bristled, 161,000 cubic feet in the minute would be the discharge?—Yes.

2566. Of water?—Yes, the maximum discharge of the channel running bristled, as you put it.

2567. Then, if a greater amount than that came down the river wouldn't the discharge be facilitated by the river overflowing its banks or having a larger channel?—Certainly, I calculate that the maximum flood after the drainage there would be 550,000 cubic feet a minute.

2568. Sir JOHN McKEEVER.—The maximum flood after the drainage works have been completed?—Yes, 550,000 cubic feet the minute. That is agreeing with Mr. Manning as to the maximum at Athy, which he puts at 400,000 cubic feet. I consider that it would gather up 150,000 cubic feet a minute, which formerly flowed down before the main flood came, but now the two floods will come together and provision should be made there for a maximum flood of 550,000 cubic feet a minute.

2569. Mr. HARRISON.—That is what really did pass down on the occasion I already referred to?—Yes, occasionally the full flood did come down at the same time as the tributary floods, but that was not the rule, it was the exception, and in future, after these works are carried out, I think the rule will be the other way, and the two floods will combine before they get down this length.

2570. Lord CARMARTEEN.—Supposing that the tributaries were not drained at the same time that the main river was drained, what difference do you think would that make?—Well, some of the tributary rivers are drained already you know—the Barren and the Larr are drained.—

2571. And the Bannagh river?—Yes, but I don't apply my observations to it because it is above Athy.

2572. But still you take in into your calculations, don't you?—No, I mean all the tributaries below Athy, because I take it that these tributaries above did previously come all together to Athy—previously I think they did, but I say that these tributaries below Athy had a shorter distance to come, and could

come more rapidly to the main river, so that they arrived and flowed off before the main body of flood came down, which as you have based in evidence took about five or six days. But now they will meet as a rule and come down in one body, while formerly they only met very occasionally.

2573. Mr. BAILEY.—Then, I understand, Mr. Price, that your apprehensions of the damage to be done by the floods arises more from the concurrence of the floods which will take place under the altered condition of things, than from the increased amount of water that will be sent down from the drainage districts at any one particular time?—That is exactly the thing—the concurrence of the floods.

2574. Lord CARMARTEEN.—From the main river and the tributaries?—Yes, exactly. The floods from the main river and the tributaries coming down concurrently.

2575. The concurrence of floods at Cadover?—Further down—below at Bagnalstown. I think that they did come occasionally—but very seldom—simultaneously before, but that the rule will be that they will come simultaneously in the future.

2576. Mr. BAILEY.—And nearly all the tributaries from which you fear this result, do fall into the Barrow above Cadover?—Yes, except the Barren.

2577. No, the Barren falls in at Cadover too?—Just below Cadover.

2578. Absolutely it is in Cadover, I may inform you?—But it does not flood Cadover town. While on this subject—in order to keep the evidence bearing in the same point all together—I might give you figures for two other reaches of the river that I have examined. The next reach of river is from Messrs Brown and Crosswhite's mill at Bagnalstown to Finner's Quail lock—a distance of two miles—and the fall per mile is 61, that is practically eight tenths. The average width is 140 feet, and the average depth four feet, the height of the land above the surface of the water—when I took my measurements—was 2-6-49, (or 24 feet about) but I have allowed for three feet, as it might have been a very low river that day. This channel when overflowing would discharge 174,000 cubic feet per minute—just when bristled, and the maximum flood after drainage, I calculate there to be 600,000 cubic feet, taking about one cubic foot an acre. The next reach is from Ballyallen Upper to the Ballyallen Lower Lock which includes the town of Garabridge. It is one mile and a quarter long, and the fall per mile is 1-4-8, or one foot six inches, the average width is 140 feet, the average depth is four feet, the height of the land over the water is five feet, there are some lower parts, but I have taken it as five feet all through, and that channel, just overflowing would discharge 180,000 cubic feet per minute. The maximum flood after drainage I estimate at 625,000 cubic feet a minute.

2579. Does that include everything you wish to say about the different reaches of the river and falls?—Yes, that is all I have to say on that point.

2580. I think you said that the average width was such and such—130 feet, 140 feet, and 160 feet in the three reaches you mentioned respectively?—Yes.

2581. Now, when you come to consider the discharging capacity of river channels, is it fair to take the average width—mustn't you take the narrowest point, is not the discharging power of a river measured necessarily by its narrowest point?—Oh no. Of course it would be a better river from that point of view if it had that 140 feet of uniform width throughout, and a uniform depth throughout, but you must make allowance for obstructions. The surface of the water will be comparatively level passing over some flat parts of a river's channel, then there is a sudden bend and a declivity, but I think it is a very fair way of roughly doing it to take the average width and depth throughout. Of course to go into the matter very nicely you must make cross sections of the whole river.

2582. The proposed new drainage works for the river bed being at Athy, I think, 160 feet width

and a depth, from high flood water to the bottom, of nine feet, do you consider that this formation of the river channel, which you have described down here at Baginbown, Milford, and other places, sufficient for the discharge of the water?—No, it is utterly inadequate. Of course it is inadequate now, and the consequence is that there are large tracts of land flooded there for a great length of time. But unless something is done it will be far worse in the future.

2583. Mr. BARNES.—I should just like to ask Mr. Norton one or two questions on matters of detail, that perhaps he can give me some information concerning. Do you remember, Mr. Norton, the flood that took place in September, 1879?

2584. Mr. Norton.—Well, I do not, because floods don't affect me at Baginbown. My mill-works there are above the range of the floods in consequence of the opening at the mill-race there being very wide.

2585. Mr. BARNES.—Then your observations refer principally to the Milford place?—From Milford to Leighlinbridge. At Milford, I know that if there is any increase of flood at all, great injury will be done to these concerns.

2586. I think your connection with the Milford business is only recent?—Only recent.

2587. Is there anybody here that could give us evidence with regard to the Milford mill, and the great floods that have taken place there, say within the last twenty years?—Is there anybody in the room who can speak as to that, do you know?—No; I think Mr. Watson might give you the best information on that point.

2588. There was a heavy rainfall in September, 1883—on the 1st September, 1883—do you remember that?—No—oh, yes, I do recollect it and the mill was stopped then for several days by back-water.

2589. Now, how often in your connection with Milford has the mill been stopped by back-water?—Oh, whenever there is any ordinary heavy flood.

2590. It is stopped by back-water?—Yes; whenever there is any ordinary heavy flood it is stopped by back-water.

2591. Can you compare the state of the river now with what it was before the drainage of the Barrow?—Of the river I cannot; but as regards the traffic upon the Barrow navigation I know that twenty years ago it was very much more satisfactory—that the boats could take full loadings nearly all the year round, and it is very seldom, indeed, that they can do that now—carry their thirty-five tons.

2592. Mr. PRIOR.—May I ask you what depth that requires?—I cannot tell you that.

2593. Mr. BARNES.—Then you have observed a general diminution of the carrying power of the river in the navigation part of it?—Yes, and I attribute that to the silting up of the river. I have asked the men frequently how it was that they carried such small loads now compared with former years, and they always say they cannot get over certain spots on the river—between Carlow and Baginbown, and some places above Leighlin they principally complain of—when fully laden. I had myself now, down at Milford during the last month, to get the Barrow Company to send their dredge there to clean up the race going up to the wheel—where the boats unload—and they took a very large quantity of stuff out that had collected there during the last three or four years, and now the boats can come in with their full loads.

2594. But hadn't that to be done at intervals for many years past—was it admittedly the duty of the Navigation Company to keep the navigation course open by means of dredging from time to time?—Of course it is, but I gave that instance to show how the silting up has increased of late years.

2595. Have you reason to believe that that has been effected in any way by the recent drainage of tributaries like the Barrow?—And the upper river—by these and by the upper river.

2596. What do you mean by the upper river?—The Rathangan river, because when heavy floods come, part of that that remains above Athy no doubt comes down, and the drainage of the Barrow and the other river between that and Carlow, no doubt, have, all acting together, increased the sending down and accumulation of silt and mud in the lower bed of the river. At least that is my opinion, and I know that it is also the opinion of many others in that neighbourhood.

2597. Mr. HANNAH.—Mr. PRIOR gave us the falls as 1-10 and 1-45 feet in different reaches of the river?—Yes.

2598. Is that the fall between the wheel and of one weir and the crest of the next?—No, I took a place where the weir was down—near to the lower lock.

2599. But I want to know was that the natural fall of the river, or is it the fall of the river since the navigation works have been constructed?—Yes—acutest now.

2600. Oh, so it is now?—Yes.

2601. Sir JOHN McKELIN.—It is the surface fall?—The surface fall; but I may say that I chose places where the natural flow of the river was not affected by the damming as it was at the lower end.

2602. Not affected by the weir?—No—where it had a pretty uniform depth throughout—not quite shallow at one end and deep at the other.

2603. Still the fall of the water there would be less than before?—Oh, naturally it is less since the navigation works were constructed.

2604. Mr. FORTES.—I want to mention another thing—that a certain injury would ensue if this drainage was carried out in cutting off the water supply to Surinbreen mill in the summer time—no doubt there will be less water coming down in the summer than now. Of course all that had to be drained above Athy now holds a quantity of water that comes down regularly in the summer, maintaining a pretty constant supply; but after the drainage works have been carried out there will be no catchment for water there—it will all come down suddenly and in the dry months the waterpower in these mills on the Lower Barrow—Mr. BARNES's and my own especially—will be cut off; at all events the waterpower will be certainly very much diminished. We have then the two dangers ahead.

\*2605. Sir JOHN McKELIN (to Mr. PRIOR).—You stated, with reference to the reason you have been alluding to, that the maximum discharge in future would be a certain amount—in some places 500,000 and 600,000 cubic feet per minute—that is the future maximum discharge?—Yes.

2606. What is the present maximum discharge, as you answer?—I had not an opportunity of estimating that at all. I can only give you a conjecture as to what it is. I dare say that occasionally the maximum discharge was as great in the past as what it will be in the future; but, as a rule, it would be considerably less. On account of the formation of the catchment-basin, the floods did not come down simultaneously before, as a rule.

2607. I think in your former evidence you stated that you admitted that the maximum discharge at Athy would not be greater in future, supposing the works were carried out than it is at present?—I don't think it will.

2608. And surely there is no reason why a different rule should be applied to the discharge below?—Oh, yes, and I have given my reasons for it. At Athy they spread out like the branches of a tree, all coming in together under the bridge there at the same time; but from the nature of the ground and the stoppage at Bert, and the large overflow-basin which was able to keep up the water—it took a considerable time to fill that basin—and therefore the flood was not concurrent, except very occasionally, the floods were not concurrent at the lower part.

2609. But would not these drains below Athy, supposing the rainfall to be of moderate duration, from twenty-four to forty-eight hours, have emptied? would not the water have passed away before the water from

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the upper rivers come down to—I dare say for a short flood like that; but I speak of a four days' flood, which is the duration of consecutive rainfall which Mr. Roberts, one of the Commissioners of Works, was of opinion—in another inquiry—should be guarded against.

2602. Have you made any calculation as to the length of time it would take to flood the lands now flooded after saturation—what length of time it would take to fill the flooded lands, after saturation, up to their maximum?—I have not, but I have made a calculation that bears upon that.

2610. Would it exceed forty-eight hours?—The filling up of that—it is one-thirtieth part of the catchment-basin, as far as I can make out.

2611. It is more than that above Athy?—What I say is this—it has been stated by Mr. Manning, I think, that 25,000 acres is the quantity of land actually flooded—there are 45,000 acres flooded and injured, and of that about 25,000 acres are flooded, and the proportion of that to the whole catchment-basin above Athy is one-thirtieth, I think.

Mr. HAMMOND.—No, one-eighth, nearly.

2612. Mr. Price.—Is that so; there probably I get the wrong quantities (After working it out.) Yes, I believe it is one-eighth; I mistook my own figure. Yes, one-eighth of the catchment area. Well, on comparing that with the other districts, I took such as Lough Neagh, and the effect on the river Bann—I found it is one-thirtieth part: the Shannon, and lakes on the Shannon, are only one-thirty-first part; the Lough Corrib one-tenth part, and the Erne about one-twenty-second part.

2613. Sir JOHN McKEIL.—Well, but returning to the point, the length of time it would take to flood these lands, assuming that they would be one-thirtieth of the catchment area, I apprehend that the lands would be flooded to their maximum depth within thirty hours?—That would depend upon the condition of the land beforehand.

2614. Assuming it to be saturated?—I dare say it would.

2615. That would leave two and a half days of rain in four—the difference between the thirty hours and the four days—during which the maximum flood would be passing over?—Then you would suppose that once it filled up and overflowed, it would come down as fast as it left a channel.

2616. Yes?—And as fast into the part into which it overflowed, but I don't think you could assume that. Supposing the rain commenced simultaneously all over the drainage area, it would not be able to fill the pond for a certain time, it would take a long time getting down through the upper parts, and then when it filled the pond it had a long time to get down through the lower parts, but I based my calculations on the statement made in evidence here, that it would take six days to come down.

2617. It has attained its maximum at the end of thirty-six hours say, at all events, and therefore there would remain two days, during which the flood pours over it at the rate of 400,000 cubic feet per minute?—I suppose that occasionally the thing does happen now, I think so.

2618. And that would apply to the tributaries below Athy also?—Yes, occasionally they would meet as before. But after heavy rain had taken place it took about six days, that was the evidence I heard, and I am not sure whether it got down to Athy before the tributaries had discharged their maximum flood below Athy. But that is what was stated in evidence, that it took six days for the main floods to come down.

2619. Mr. HAMMOND.—What amount of rain do you estimate falling in the four days consecutive rainfall?—Well, I have not gone into that exactly, but I should say about three inches.

2620. Three inches in the four days?—Yes.

2621. You have, of course, excluded the image showing the whole drainage area?—Yes.

2622. Is it very flat?—Yes.

2623. As I make out, out of the 480,000 acres in

the catchment area, there are 324,000 acres flat, or comparatively flat; don't you think that the water would run off very slowly from that, the ground between the valleys in which the streams run is either bog or gentle undulations of cultivated lands?—Yes.

2624. Don't you think the water would run off very slowly from that?—That is after it is drained.

2625. At present, or after it is drained?—At present it does run off very slowly; we have experience of that in the existing state of things. After drainage is another thing.

2626. Why, it would run off so faster between the watercourses than than it does now?—It would, and I will tell you why, from the moment the main artery is sunk everyone will take advantage of it, and will sink their drains which they cannot do now.

2627. You don't follow me, if there is a flat wide land, with a very gentle slope, deepening the water-courses won't, to any appreciable extent, affect the velocity with which the water will run off?—Except the farmers will take advantage of it.

2628. And what good is it except the farmers will take advantage of it?—I quite admit that if you made a main drain—a main arterial drain—except advantage was taken of it by the farmers, the water would not come so very much faster.

2629. Supposing the ditches were all closed up, as you say, would it not be a distinct off which runs would flow comparatively slow?—Yes, but a great deal faster after these proposed works are executed than at present; that is all I say.

2630. Lord CROMARTY.—Mr. Norton, I wanted to ask you a question or two, you say that now the locomotion of the Barrow Navigation Company is much retarded by the silting of the river. I understood you to say that?—Yes, the boats are not able to carry the same loading as formerly.

2631. And, therefore, of course, that is an injury to your business?—Well, it is more an injury to the Barrow Navigation Company and the Grand Canal Company, who are carriers, than to us, though, of course, to some extent it retards our business. If we want to get up 500 barrels, and can only get 250, it must retard our business.

2632. So I supposed, therefore if the silting were taken out of the river it would benefit your business?—Yes, and the business of the carrying companies too.

2633. Yes, then as to your mills, you said that the summer water was much lower now than it had been previously?—Of course the water in summer is lower, but what I said was, that if this drainage scheme was carried out, the water that at present forms a reservoir for summer use would pass away, and that in a dry summer there would not be that reservoir above Athy which discharges by deposit now and gives us a summer supply of water.

2634. Take an ordinary dry summer, can you work your mill all through the summer months?—We never stop.

2635. You never have been obliged to stop from failure of water supply?—No, but the power is lessened no doubt.

2636. At present?—Yes, in a dry summer, but it is not lessened very much, not to the injury of the mills, not very much. That is the great advantage of those mills on the Lower Barrow, that as they stand at present they are never short of water in the summer in consequence of having this large reservoir above Athy, that is constantly trickling down and keeping up our supply. There is no other river in Ireland that I know of where the same condition of things exists, and, of course, that has proved a great boon to us.

2637. Suppose, that in the drainage works, an approximately equal level was kept for you with or about the same water supply in summer, that would not hurt your business, it would rather benefit you, because you are only depending now on this reservoir that you speak of?—Of course if there was a level up to what it is now—

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2433. Up to the low summer level we will call it—Then our business would not be affected, if there was the same quantity of water coming down. But if there was not the same quantity of water coming down to keep the river up to this level we would be injured.

2434. But if the water was sent down in the same quantity and at the same level you would not be injured?—No, I quite admit that—not from failure of our summer supply.

Mr. HARRISON.—Several witnesses have spoken about this reservoir above Athy. It is a curious fact that there is no water to be found now in the basin above Athy, nor has there been any for some time past.

2440. Lord CARLISLE.—That is just what I was coming to. (To witness).—There is no water impounded now above Athy, and the Barrow is, perhaps, lower than I ever knew it to be at this time of the year—it is very low!—It was lower last year though—much lower I think.

2441. Up at Monasteren where I am referring to?—No, at Carlow and at Milford.

2442. And don't you think that the water is kept at the level it is for pen mill works in summer, by the weirs that are placed across the river by the Barrow Navigation Company near?—Of course.

2443. Then it is not so much the reservoir that you allude to above Athy, as the weirs that maintain your summer supply?—I don't agree in that.

2444. You see the reservoir has disappeared now—there is no water impounded above Athy?—There must be more or less of a reservoir up there.

2445. No—nothing but the channel: nothing I can assure you in the nature of a reservoir?—Why all that land that is undraind now is a sort of sponge from which the water is coming out continually during the summer, and trickling down from the upper districts to supply us.

2446. I don't think there is much water coming out up there now?—Oh, I should say there must be.

2447. Lord CARLISLE.—I should like to ask Mr. Price that question—at the present moment, as far as you know the river, Mr. Price, is it not more the weirs that keep it full than the reservoir above Athy?—Yes, if the weirs were taken down the water would run off. As a matter of course they dam up the water.

2448. And what would be the effect of their removal on Mr. Norton's mill?—Oh, it would stop the mill.

2449. Then it is not the reservoir that keeps up the summer water supply?—Well, the two act together to maintain the supply. The river could not be kept at that level if there was no supply coming down from the upper end. I agree with Mr. Norton entirely—that there is a great deal of water coming down from these upper parts. Otherwise where does the water come from now that fills the Barrow? It must be from the reservoirs as they are called—the lands which owing to land drains and so forth, hold the water for a considerable time.

2450. Supposing that the drains were cleared, all the obstructions above removed, and the water allowed free course, from where this reservoir is supposed to exist, in summer the same effect would be produced by the weirs, that they would filter that water slowly down to Mr. Norton's mill; they act as barriers to the water coming down rapidly?—If there are 10,000 cubic feet coming in at the upper end, he can draw 10,000 cubic feet at the lower end per minute out of it, but if it does not come in at the upper end he cannot do that and his mill will be stopped. The supply must necessarily come in at the upper end from somewhere, and as a matter of fact, it is coming in now sufficient for his purpose. The question then is, will it be coming in afterwards just the same as now. Mr. MURPHY contends that it will, and I say it will not, to the extent that it is coming in now.

2451. You maintain that at the present moment actually the whole reservoir that supplies the mills and the navigation is the water that is retained by weirs

and obstructions in the upper portions of the Barrow and its tributaries?—Yes, and in the ditches and drains that are now in a dirty state, and are not able to let the water off fast enough.

2452. Did you take into any calculation the evaporation of that great area, and did you take into consideration the springs—there are such things as deep seated springs—which keep supplying these ditches and drains?—I don't think there is any deep-seated spring in that large catchment area that is not supplied from the rain itself.

2453. But those springs must be in the drainage area coming from the range of hills at the back?—That is all included in the catchment area.

2454. But those hills are sending down water from deep-seated springs?—These must come from some higher ground.

2455. Higher ground at the back of the catchment basin?—I don't think there is any higher ground than that, judging from the formation of the country contributing to the water there, otherwise we would find very different results.

2456. You think that the whole reservoir now is practically the water retained by the weirs and obstructions in the small drains and tributaries, and in the main river—the Barrow?—I do.

2457. Mr. HARRISON.—It is not all spring-water; even coming in now?—That is identically what I say. While on this subject I may give the results of some experiments which possibly may be interesting, and which I conceive, bear on this subject. What I say is this, that if land was drained by drainage operations, and by minor drains also, till it gets thoroughly well dried, as it ought to be for farming operations, during the summer time it affords no water whatever. And I have that conclusion on these experiments. Grass lands, or thoroughly drained lands, give off no water if fairly dried before the summer comes on. I had gauges sunk in a field of my own—in ground covered with grass the same as the rest of the field from which I drew off the water regularly in sunk iron tanks. I had two rain gauges which showed the quantity of rainfall, and in one year this was the result of my observations. This, remember, was well drained land—dry land covered with grass—and in one year, during the months of May, June, July, August, September, and October there fell 15·88 inches of rain in my rain gauge, and there only percolated out through the bottom 51 (or about half an inch). So that the whole of that either evaporated or was absorbed. The experiment is very curious when we come to the winter months, and the land is saturated. In the month of January, out of a rainfall of 4·35 inches, three-fourths of it went through, and in the month of February four-fifths went through, showing this—that drained land, when it is once filled, gives off its water much faster than undrained land; but that when it is once dry it gives off no water at all, until it gets a very great rainfall.

2458. Sir JOHN McKENZIE.—Did all that expenditure of water pass off by evaporation—the difference?—Evaporation and soakage. It had to saturate this piece of ground sixteen inches deep, and the grass of course absorbs a great deal. I was comparing grass evaporation with water surface evaporation—I had a water surface evaporation at the same time. Grass lands absorb water in three ways—it goes off in the growth and sustenance of grass, by the grass holding it up to the air to be evaporated, and by soaking.

2459. Mr. HARRISON.—And what becomes of that soaked water?—It was 'soaked down'—it drains out in fact.

2460. Sir JOHN McKENZIE.—How does it dry out?—I don't know, but those are the facts, and the experiments may be tried.

2461. It is different from other experiments and from general experience, that through drainage has the effect of throwing off the water downwards much more rapidly than previously, when it could only be thrown off by evaporation?—Well, the result of my experiments was, that for these summer months only

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half an inch come through, and in the two winter months a considerable quantity came through—the great portion of the rainfall. I kept these gauges myself very carefully, and had five or six observations taken at the same time.

2662. Colonel CARTER.—Mr. Norton, one of your objections to this scheme appears to be that the obstructions—the basin which now holds this water would be done away with; that that which now injures so many people up above would be remedied, but for your own convenience you would prefer things being left as they are?—I don't prefer them as they are, but I object to the injury that is likely to result in the lower river if this drainage scheme is carried out, so that the water will run away suddenly. Of course, it will improve the people above, but it will render us liable to floods below, and in summer it will leave the lower part of the Barrow without the supply of water it has at present in summer.

2663. In consequence of the improvement of this large basin?—Yes.

2664. The condition of which works great injury to the people now?—No doubt; but in improving the condition of things above, we want you to take care that you don't inflict injury on us below. I have told you of our fears, that the works will interrupt our summer supply of water, and I also think that these sudden floods coming down in winter will cause a considerable rise in the floods on those parts of the Lower Barrow where the river is not deep. There is no doubt in the world, that there is no means of escape for any greater flood than is coming down at present.

2665. Mr. Frier, M.R.—May I just say that all the gentlemen here, and all those for whom I am professionally interested are entirely in favour of the drainage of the Barrow, and that they only want such works to be done with reference to the lower river as will preclude the probability of their incurring much injury. If the matter is looked to now, it will in all likelihood prevent low costs and litigation hereafter. I am strongly in favour of the drainage of this great district, and so are all of these gentlemen, but the Lower Barrow should be considered by the Commissioners as part of any scheme to be adopted, and they should see what is most desirable to be done in order to meet risks and dangers to interests there.

Lord CAIRNESS.—That is exactly what we are now examining into.

2666. Mr. Frier.—But some questions put by Colonel Carter seemed to imply that Mr. Norton was against the drainage scheme altogether. In the very outset, when I was consulted by these gentlemen, I made that a *claro quia* son—that we were not to oppose the scheme, and they were one and all agreed with me as to that. Otherwise I should not have noted for them, because opposition of the kind would be against my own interests and ideas of what is right to be done. All we are here to urge is, that in any scheme that may be agreed upon, the interests of those along the Lower Barrow will be safeguarded.

2667. Mr. Norton.—No doubt if the drainage is to go on a very large sum must be expended on the river at Bignallstown, and at Garlow, and below it, in widening and deepening it.

Mr. Walter  
Brown.

Mr. Walter Brown examined.

2668. Lord CAIRNESS.—Would you kindly state anything that you have to say to the Commission?—Well, I can only repeat what Mr. Norton and Mr. Frier have said. There is no use of my going over it all again.

2669. With reference to what points?—With reference to the sending of the water down in greater volumes at flood times, and lessening our summer supply, both of which would injure us greatly and delay our business.

2670. What part of the river do you refer to most particularly?—Between Athy and Bignallstown.

2671. What is the name of your place?—Brown and Crossin's is the name of the firm—Bignallstown.

2672. Will you continue what you have to say?—Well, Mr. Norton has stated, almost in the very words that I would put it, all I have to say, and there is no use of going over it all again. In reference to the injury caused in the times of high water, we are flooded very considerably there, and have to look up our doors, as Mr. Norton said.

2673. You are below Mr. Norton's mills?—Yes. We have now to put suds in our doorways to keep the water from running into our doors at present. I think it was stated before to the Commission by Mr. Frier that last year the whole of the summer water was passing through our mill wheel.

2674. Then you suffer in the same way as Mr. Norton, from low summer water?—Yes, we have at present just sufficient power for our purposes, but if this drainage were carried out, and the waters carried suddenly off, it would injure our milling power considerably, and, if the floods were increased in water, it would injure us very much—both stopping our milling power. I believe that at present we are more free from back water than any other mill on the river. We can work longer than any other mill on the river.

2675. How do you account for that?—I suppose it is the better fall. I cannot account for it in any other way.

2676. Mr. HARRIS.—Your's is a twelve-foot fall?—Yes, a twelve-foot fall.

2677. Lord CAIRNESS.—Have you a better fall than Mr. Norton's?—Yes. I think we have the best power on the river at present. Last year we were just able to drive all our machinery, and this year it is scarcely so low as last year, at least as yet.

2678. Mr. BROWN.—What date do you refer to as being lowest last year?—The month of September was the lowest month of the river last year, I think; but we are not so low now as we were last year in September.

2679. We have not reached September yet, though. Comparing the beginning of August last year with your present supply, are you lower this year, or just about the same?—I think we are a little lower than we were last year in the month of August.

2680. Do you apprehend most damage to your business from the supposed increase of floods, or from the diminution of water in summer?—Well, the diminution of water in the summer will injure our business more than the floods, that is in interfering with the regular course of business. The floods will injure us in this way—they pass off quicker, but they do a greater amount of damage to the property around.

2681. Entail more material loss?—More material loss. But they pass away much quicker, of course.

2682. Mr. HARRIS.—I wanted to ask Mr. Frier a question as to the drainage area below Athy. It is very much less for a mile in length of the river than it is above Athy?—Yes.

2683. And the ground is much steeper?—Yes, it is.

2684. So that the water would run off much more quickly?—Yes.

2685. So that the contingency of the flood from the upper district meeting the flood from the lower river in a remote contingency?—I think not—that is, if you take a few days' rainfall. Then I think the floods would be concurrent. Even if you take a two days' rainfall coming on the river in a state of half flood—which is the usual case—the upper floods would come down in a day or so.

2686. A half flood would not be very much?—But supposing a big flood came on the top of the half flood, which is my experience.

2686. It would require something about four days' rain to effect what you say, I think—I took a four days' rainfall in my calculation—that, as I have stated, was my basis.

2687. Sir JOHN McKEERIE (to Mr. Brown).—Are you subject much to stoppage from back water?—We are, generally three or four days in the winter time, from back water.

2688. For how many days at a time?—I have seen it last two or three days, and so on. Last year I don't think we were stopped at all.

2689. But that was an exceptionally dry winter?—Yes. The summer water is much more valuable to us than the winter water, of course, and we are more apprehensive about any interference with our summer supply of water.

2690. Mr. HARRISON.—Are you wholly stopped by the back water when it does affect you?—Sometimes we are wholly stopped. We could work, you know, but it is very severe on the wheel.

2691. The heaviest wheel?—Yes, the heaviest wheel. But summer water is much more valuable to us than the winter water. There is a better demand for stuff then.

2692. Mr. BAKER.—Just let me ask you one question. Have you recently gone to considerable expense in putting up new machinery in your mill?—I have spent \$6,700 or \$6,800 on the mill in the last two years, and I may say \$1,000 before that—before we cleared out the old machinery and put in the new.

2693. Can you give any evidence with regard to the alleged silting up of the river in the last few years?—Well, I am only connected with Baginbown since 1875. But we had not at all the same trouble in getting down a full load of goods then that we have now. We are put to a great deal of trouble now. Our mill was stopped for twenty-four hours last year because of the delay in getting what we wanted down. And it takes two or three boats now to bring down what one boat took when I first became connected with the place.

2694. That is since 1875?—Yes.

2695. In ten years this difference has arisen?—Yes.

2696. And is that owing to any diminution in the care that has been taken in keeping the navigation open?—I mean in the measures adopted by the Navigation Company for dredging, and so on—I cannot answer that, because I don't know the measures they took to keep the navigation open before that. Mr. Watson, perhaps, could give you more information upon that subject.

2697. Sir JOHN McKEERIE.—Are you dependent entirely upon water power?—Entirely, and if this discharge is carried out we will simply be put to the expense of putting up a steam engine.

2698. Lord CASTLETOWN.—I was going to ask a question about that. Supposing that this silting went on as at present, in all probability you would be stopped by the very fact of the boats not getting down to your mill?—We would have to make arrangements with the railway company then to bring down all our stuff. Of course that would be an increased expense.

2699. Have you any experience of mills worked both by water and steam power?—No—none myself. In Dublin I have mills worked altogether by steam,

and in Baginbown they are worked by water power only.

2700. But they are sometimes worked by water power and sometimes by steam power—some mills?—Yes, that is so.

Mr. PRICE.—There is a witness here whose mill is worked by both, and he can give you information on that subject.

2701. Colonel CANNON (to Mr. Brown).—If the river was improved below, you say, from Carlow to Ashy, you would have no more in summer than if this scheme was carried out and the river improved to Carlow?—In fact, you would rather that the river was left as it is—Exactly. It is a very serious thing after laying out so much money to be left without water in summer time, when we can do much better than at any other period of the year.

2702. Lord CASTLETOWN.—And you don't suffer now from deficient summer water?—Not now—not since we put in new machinery. Formerly when we had very heavy machinery driving numerous pairs of stones we were occasionally stopped, but we put in rollers and new machinery, and since then we have plenty of water.

2703. Then you would not be obliged to stop except by not being able to get stuff down to your mills by the boats?—That is all, and that only happened once last year. But we have had to get stuff down by rail at large expense.

2704. Sir JOHN McKEERIE.—Do you prefer water to railway carriage?—Oh, yes, it is cheaper, and not only that but it brings the stuff to our very door at the mill, and the usual boats go down to the ship's side. If we send by rail we have to be paid to pay for carriage to the station, and then have to draw the stuff from the railway to the mill.

2705. Lord CASTLETOWN.—Supposing that the silting continued and that the navigation was stopped, you would have to get your stuff by rail?—I would not the fact of the loss on the higher rate that you paid for railway carriage almost compensate the expenditure of putting up steam machinery and allowing the river to be drained out?—I think not.

2706. Not in a course of years even—you would then be sure of a navigation way for your boats?—I think not.

2707. Of course you would be in the hands of the Railway Company entirely?—Yes—if the navigation was stopped, but that is very unlikely, I should think.

2708. And you would lose the advantage of the boats coming alongside your mill?—The Barrow navigation can never be stopped at that way; I don't think it can.

2709. But suppose the silting went on they could only carry in the winter time?—Then it would be perfectly useless, but I don't think the Barrow navigation could allow that.

2710. And it would be a very serious thing and almost necessitate your stopping work if that occurred?—It would be very serious as the competition in trade is so keen nowadays.

2711. Almost necessitate your stopping working the mill or necessitate your going elsewhere?—I would not say that but it would be a very serious thing.

#### Mr. Henry Watson, examined.

Mr. Henry Watson.

2712. Lord CASTLETOWN.—Have you any information to give the Commission, Mr. Watson?—Well, I am a good deal interested in making down in Carlow and Leighlin Bridge, and we have been suffering from water there from time to time to a considerable extent, particularly on the Quay in Carlow and in one of my houses in Leighlin Bridge. My attention was particularly drawn to the flood last spring—in April. It

was as you will remember a very dry spring and I happened to remark that the land was very dry and that there was no great depth of water at Leighlin Bridge at the time. I left and returned to Dublin, and in the course of a few days my partner wrote me that "the flood was up to the Carlow road"—an exceedingly high flood for that time of the year.

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Mr. Henry  
Watson.

2713. What time is April, I think it was.

2714. Of the present year?—Yes—last April. I think if you take into consideration the very dry state of the country around at that time—it was as dry as it had ever been in spring within the memory of man—there is not the slightest doubt whatever that if drainage was carried out in the Upper Barrow it would have sent that flood down with tremendously increased volume. There was no great rainfall that I saw at the time to account for such a flood.

2715. That is no local rain?—No local rain.

2716. Sir JOHN McKEILL—What date was this?—I think is April.

2717. What date is April?—I could not tell you.

2718. Last April—1885?—Yes. When building a new mill-house in Leighlin Bridge—on which I laid out £2,400 in 1883 and 1884—I had out my floors and levels by the previous flood heights. I raised the level of my new house eight inches over the highest water we have known there. The house that I took the level by had eight or ten inches of water in it in 1879 I think, and I raised the level of the new house six or eight inches over that.

2719. Mr. BEVINS—That is above the flood level of 1879?—Yes, thinking that that was making ample allowance for any flood that could possibly come down. But from my experience of the flood last April, if these drainage works are carried out I don't think that will be at all sufficient. The weeds and obstructions act as barriers, but if these are removed and the water sent down in volume upon us, I don't know what damage would occur. I have lately remarked to the boatmen on the river "you have very little water," and the answer invariably was, "yes, but the weeds are very good to us you know"—they kept the water back for them. There is not a mill house in that whole district that will not be affected if the drainage is carried out, in my opinion. For instance in that new house that I speak of, I have £800 worth of stuff on the ground level, I have no place else to put it, and that might all be destroyed in one hour by the flood. Of course I have no object in stopping the drainage—I am very fond of drainage myself and would like to see these works carried out, provided that they did not injure us materially below or injure the navigation which we have a great interest in. Our concerns are all built on the river for that navigation and not on the line of railway. I am three miles from the nearest railway station—and never use the railway to any great extent.

2720. Colonel GARDNER—Was that flooding you spoke of at Cuckoo or at Leighlin Bridge?—Both. My manager at Cuckoo told me that the flood went within an inch of the top of the quay wall in Cuckoo, and he had to dam up, or make preparations to do so.

2721. Mr. BEVINS—Do you know anything about the islands of recent formation on the river Barrow?—I do. The silt is coming down the Barrow from time to time and these islands are relaxing and collecting the silt very much. They take in this fine silt and every flood that comes leaves a certain amount of deposit on the top, thus they rise perhaps half an

inch or an inch every flood. Thus the islands extend in surface from time to time.

2722. Do you know of your own knowledge an island formed in the river that from your memory did not exist there before—a new island?—Well, at Laughlin Bridge there is an island growing below the bridge which was not there, and above the bridge there is another island which has come down, I suppose, 20 feet at all events in recent years.

2723. That is, it has extended its size down stream?—Yes, and it is still extending—down below the bridge, right through the centre arch.

2724. Any other place you can speak of?—Well, the island below that again, below the church, has grown enormously. It has extended towards both sides of the river, and leaves a very narrow water channel now.

2725. Lord CASTLETOWN—You say that the flood in April came up to your floors that you say had been made 6 or 8 inches over the level of the '79 flood—the new house was completed then previous to that April flood?—Yes, but that flood did not do me any harm—it did not rise high enough. I speak of it only as a feature in the case. A high flood without local rain rising so high, what might we expect in the altered state of things unless some provision is made for safeguarding our interests.

2726. How high did it rise—was it over your doors at all?—No, it did not come in on my place at all.

2727. Sir JOHN McKEILL—Did it come near the flood of '79?—Oh, I should say not within a foot of it.

2728. Lord CASTLETOWN—But you say it rose very near to the top of the Quay wall?—Well, I could not say exactly, but I know that it came out to the Quay road.

2729. And was there no heavy local rain to account for that?—Not to my knowledge at all events. I was surprised when I heard of it, so soon after having seen the country down there dry and parched looking—surprised to hear that the water had risen to such an extent at all, taking all the circumstances into consideration. There is one matter that struck me here—speaking of these tributaries coming in, I will take the Barrow for instance. I remember when that Barrow river was sunk and it has considerably filled up again.

2730. The Barrow?—Yes—it has filled up very much, and that must alter the flow of course and the calculation of the water coming down out of these different tributaries at different times, because it does not come down now as it did, and will, in fact, require to be sunk again. It has filled up fully 2 feet, and it keeps back the water at present.

2731. Do you find that the fact of that river being filled up creates to any extent a reservoir such as Mr. Norton was speaking of?—To a great extent it does. To my knowledge a drain that had two feet of fall has now no fall at all, and in fact that river will have to be sunk again, which will increase the flood of the Barrow.

\*2731. That is the Barrow river?—The Barrow river.

Mr. John  
Hanson.

Mr. John Hanson examined.

2732. Lord CASTLETOWN—Have you anything to say to the Commission?—Yes, I have been asked to give evidence as to the effect of the drainage on our river.

2733. What river is that?—The Loch. Prumpton Mills to the name of our place.

2734. State just what you want to say?—We find that the effect of the drainage is to extend the dry season about three times as long as it used to be before the drainage. We found it necessary to erect a steam engine to supply the deficiency of water power.

2735. Three times as long—that makes how many

months in the year dry now?—I should say six months of the year.

2736. You have six months in each year of a dry season?—Yes.

2737. And previously you could work during that season?—Previously the dry season was about two months.

2738. Yes?—Then as to the effect of the silt coming down. The river, immediately after the drainage, got choked with silt, which had to be removed by the Drainage Board. That is two years ago, and at the present time it is nearly as bad again from the lodgements of further silt that has come down.

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2739. Does that still affect you at all in working?—It does—it prevents the water coming down to the head-race of the mill.

2740. And that still is removed by the Drainage Board?—It was once.

2741. And will have to be again?—I expect so. Then the Drainage Board had also to extend the weir. The original weir was only twenty-six feet long, and in order to take the flood water they had to build a new weir of 160 feet long.

2742. That is to take the new flood water?—Yes; the violent floods caused by the drainage.

2743. Mr. HAMMOND.—With respect to that weir which you have just mentioned—the old weir was quite insufficient, and the water used to run over the bank of the stream and flood all the adjacent lands?—Yes, sometimes the river was flooded.

2744. And the 160 feet weir was put in to take all the water and confine the water in the river's course—not to take a greater quantity of water?—But I believe if it had not been done the effect would have been to greatly flood our mill.

2745. It was flooded before, and that weir was only constructed in order to confine the water in a given channel in place of letting it go over the whole ground adjoining?—It would have come down in larger volumes than before, and if the weir had not been extended must have injured our premises.

2746. No, not more than before?—Oh, the water must have increased in volume in the flood season, and if the new weir had not been put there we would have suffered greatly.

2747. The water now goes away without doing any injury, whereas formerly it overflowed the banks and spread over the adjoining lands?—No doubt.

2748. With respect to the summer water being diminished in the last two years—the rainfall of the last two years has been very small as compared with previous years; you are aware of that?—Yes, I am.

2749. Sir JOHN McKEE.—Is the level of the weir the same as before or has it been altered?—The level is the same, I should think, except—

2750. Mr. HAMMOND.—Perfectly the same—extended only from 26 to 160 feet.

2751. The Witness.—The extended part of the weir was made 3 inches higher than the old level.

2752. Mr. HAMMOND.—Is that so?—Yes, certainly.

2753. Was that at your request?—Yes, at our request.

2754. Mr. Price.—Did not the Drainage Board admit the principle of giving a less supply of water in summer by providing a pond to store up water during the night for you?—Certainly they provided a pond which has been of some slight service.

2755. Lord CAMERON.—But it has not helped you out of the difficulty of the six dry months?—No, we had to put in machinery to get over the difficulty.

2756. Mr. HAMMOND.—That pond was supplied to provide for those gathering the Sunday water. The Messrs. Hammes's mill goes constantly, night and day, and that pond was to gather the Sunday water only.

2757. Lord CAMERON.—You had to employ steam to augment the deficient waterpower?—Yes.

2758. And haven't you proved that you have been able to get through your work quicker?—Well, it has enabled us to carry on our business constantly, but at an extra expense of course.

2759. Very slight though?—Oh, no, very considerable, because we have to provide coals to feed the engine, and these have to be rolled and carried from the station to our premises.

2760. But formerly you had your mill stopped for two months each year?—Well, not quite stopped.

2761. Assume then that it was stopped for one month out of the twelve, that was a great loss on the working?—Yes, no doubt.

2762. You would have to turn off hands and stop your works altogether?—No, we never stopped altogether, we always did a little.

2763. But the main body of the work was stopped?—Yes, that is so.

2764. And years in a night and day mill?—Yes.

2765. So that partial stoppage, for want of power, with all your hands there, is a very serious matter, and now you can run all the year round without any stoppage with the steam power?—Yes, of course, we use both, we only use the steam when the water power is deficient.

2766. I know, and don't you think that the loss incurred by two months partial stoppage in each year will soon be compensated for the expense of putting in the steam? I ask you only a hypothetical question, but you have had the experience and we ask to you for that experience?—Yes, we find it a benefit to our trade to have the mill going always.

2767. Never stopping, while formerly you had one or two months in the year stoppage?—Yes, that we had to be laying staff to supply on trade.

2768. And don't you think that the small amount of the cost of an engine and coals would be soon compensated for by the improved condition of things now?—It may be, spread over a period of years.

2769. Yes, over a period of years; how long a period would you say?—Fifteen or twenty years, I would say.

2770. It would take that length of time you think to make up for the loss?—Yes, fifteen years, I should say. But that is only an opinion. We have only had the steam on for one year, and have not had sufficient experience of it yet to answer that question exactly.

2771. Still, it is your opinion, that it may be compensated for in a period of years?—Yes, but our mills, remember, are different from the mills on the Barrow. On the Barrow they have water all the year round, and we had not. On the Barrow no steam would be required at present.

2772. Not at present, of course, I only refer to possibilities?—We suffered formerly from a deficient water supply, they don't on the Barrow, that is what I meant to say.

2773. Sir JOHN McKEE.—When did you put up the steam engine?—Last year only.

2774. And when was the Lorr drainage finished?—The upper part that affected us was finished in about 1892.

2775. Mr. HAMMOND.—The toll water has been a great deal lowered, hasn't it?—No, it was not. The Drainage Board are doing some additional works at present in order to relieve the toll water, and to prevent the violent floods from injuring the mill.

2776. It will be lowered?—I expect so, when the works are finished. The additional works are not finished yet, so we cannot tell what effect they will have.

Mr. James Brown examined.

Mr. James  
Brown.

2777. Lord CAMERON.—Would you state to the Commission, please, anything you have to say?—I am a working miller, your honour, and I worked in the Barrow mills forty-five years ago, before the drainage of the Barrow was thought of. At that time, in the summer, we had two wheels, and there were two pairs of stones and machinery connected with each wheel, and, excepting the summer was very dry, we had

water enough to drive one wheel constantly, and one on short time.

2778. And do you find that you have been affected by the drainage much?—The water began to decline in some short time, a year or two after the drainage, and at became worse till, at the present time, one wheel is silent, not able to do anything, and the other wheel is only able to drive half work for about six

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Mr. James  
Barnes.

hours out of the twenty-four, we are gathering a pond the rest of the season.

2778. Mr. Barnes.—Did you observe the deficiency in the summer water immediately after the drainage works?—In about a year or two it begins to fail in quantity.

2779. Do you mean to say that it was a year or two after the works were actually completed or a year after they were begun?—Oh, a year after they were actually completed. Before that we were able to drive in the summer time what I state to you, and at the present time.—

2780. You say that one wheel is idle?—Yes.

2781. And that the other is doing what amount of work?—It is only able to do work six hours out of the twenty-four.

2782. How long does that continue?—From the month of May, we will say.

2783. Until when?—Until the fall of the season.

2784. Would you say it lasts as long as six months?—I would not—no so long.

2785. And has that been the state of the case for all the years since the drainage works were completed, excepting of course a very wet summer?—Yes; excepting a very wet summer, and if it rains for twenty-four hours we have a very large flood—the bridge over the Barren would be hard set to take it; then in about twelve hours or fourteen hours more that is all gone away. There is no reserve.

2786. Compare that with what was the result of a heavy rainfall before the drainage works?—Oh, it would come down moderate then, the waters were retained above somehow and they came down moderately, not altogether, and that is how we would have water in the summer time, working the two wheels as I said.

2787. I am speaking of the winter floods. Do you find that the effect of the drainage works was that

they came down much quicker and in larger volume than before?—Oh, yes.

2788. And went off much sooner?—Yes, went away very much quicker.

2789. Your evidence altogether refers to the Barren river?—Yes, only to the Barren river.

2790. One other question before you go. Do you believe that there has been any silt—and sand—brought down, more now than there used to be?—Oh, yes, your honour.

2791. And what becomes of that?—It gets into the waterway, and when another flood comes is carried further down. And you will see it there in the summer time along the banks in ridges, where it has been left.

2792. Do you know where the Barren falls into the Barrow?—I do.

2793. Have any sandbanks or mud banks formed below that point on the Barrow?—I think there is. I think there is an island or sand-bank just a little down the Barrow from that, which was not there some years ago, but I have not much to say to that you know.

2794. Lord CASTLETON (to Mr. Price).—Have you anything further to say? We should like to know, if you would kindly inform us, what are the interests you represent here, and then if you have anything further to add we will be glad to hear you.

Mr. Barnes.—Perhaps it would be well to have on the notes the names of those instructing Mr. Price. They comprise not only millers and millstone but others who are affected on the lower Barrow, whether an owner of land or occupier—in that respect.

2795. Mr. Price.—Quite so, a variety of interests down there.

Lord CASTLETON.—Represented by the Barrow Drainage Committee, I think?—Yes. Mr. Haughton will inform you better than I can what those interests are exactly.

Mr. S. Wilfred  
Haughton.

Mr. S. Wilfred Haughton examined.

2796. Lord CASTLETON.—Can you give us this information, Mr. Haughton?—Yes, my lord. I would submit a list of contributors, and I would ask you to put on record the contributions to this fund who, I think, are representative of all those interested in this question. In that list you will find the names not only of those who are interested as manufacturers, but I think you will find in that list a very representative collection of humble men who are interested in agriculture, of men interested as millers, of men interested as millstone, and men whose duty it is to attend to the spiritual wants of their flock, and who are deeply interested in the welfare of the people and the prosperity of the district. I would leave that paper with you if your Secretary would kindly mark it, and keep it, and, as I have said, I think you will find that it is fairly representative of the fears and hopes which may actuate us who live upon the river. (Document handed in as follows).—

\* At a public meeting, held in Carlisle on the 14th instant, a Committee was appointed to conserve the interests of persons resident in the district liable to be adversely affected by the proposed drainage scheme, and for the end to increase the placing of reliable and professional evidence before the Royal Commission at the local inquiry. The Committee have engaged the services of a highly competent Engineer to make an inspection of the river Barrow from Abay to St. Malles, and to report in this matter, and they desire to invite all those interested to have the goodness to contribute to the fund established to defray the necessary expenses. Subscriptions may be sent to S. Wilfred Haughton Esq., Green Bank, Carlisle, or to any member of the Committee as under.—Committee: Patrick Dudley Shackleton, Esq., Beauparc, Carlisle; William Ward, Esq., J.P., Baginbown, P. R. Norton, Esq., 63, Middle Abbey-street, Dublin; Henry Watson, Esq., 18, Backley's-wall, Dublin; John Kelly, Esq., Wellington-square, Carlisle; James Thomas Butler, Esq., Longbridge, Hastings; W. Brown, Esq., Lodge Mills, Baginbown, S. Woodcroft, Esq.,

Lodge Mills, Baginbown; S. Wilfred Haughton, Esq., Green Bank, Carlisle; Patrick Maher, Esq., J.P., Ballyculla House, Gorebridge; Walter Brown, Esq., Hazen-street, Dublin; John Whelan, Esq., Pleigh Road, Carlisle; Richard A. Mitchell, Esq., Barrow Navigation Company, Carlisle. The following subscriptions have been already received:—Messrs. Browne and Crookwell, Baginbown, £25; Right Rev. Dr. James Walsh, Baginbown, Carlisle, £5; Mr. S. Wilfred Haughton, Greenbank, Carlisle, £5; Messrs. E. Shackleton & Sons, Carlisle, £20; Messrs. Corran & Co., Carlisle, £5; Mr. James Byrne, s.s., Kersgreen Lodge, Carlisle, £1; Sir Thomas P. Butler, Bart., Belfast, £5; Rev. E. W. Burke, Carlisle College, £5; Mr. James Cleary, Cross, Milford, s.s.; Messrs. Watson Bros., Dublin (per James Thomas Butler, Esq.), £20; Mr. Edward Byrne, Barn, Carlisle, £5; Mr. Patrick Maher, J.P., Ballyculla House, £5; Mr. Timothy Murphy, Gorebridge, 10s.; Mr. John O'Neill, Kilgenny, s.s.; Mr. Martin Reine, Gorebridge, 2s. 6d.; Mr. Philip Wall, Gorebridge, 1s.; Mr. Andrew Dromann, Greenfield, 1s.; Mr. James McGrath, Baginbown, 10s.; Mr. Charles McGrath, Baginbown, 10s.; Mr. Wm. Ward, J.P., Baginbown, £5; Messrs. Michael L. and John Kelly, Wellington-square, Carlisle, £5; Mr. James Kelly, Town Clerk, Carlisle, 10s.; Mr. James Edgar, Wellington-square, Carlisle, 5s.; Mr. J. Whelan, Pleigh Road, Carlisle, £5; Mr. John Hassard, Tellow-street, Carlisle, £5; Mr. Thomas Edgar, Ballyculla House, s.s.; Mr. Stuart, Stuart Lodge, Longbridge, £5; Rev. P. Congrave, administrator, Carlisle, £5; Mr. P. J. Newton, s.s., J.P., Dunleavy Manor, Baginbown, £5 s.s.; Right Hon. Henry Brown, Oak Park, Carlisle, £10; Mr. Christopher Fagher, Glasgow, County Kilkenny, £1; Mr. P. R. Norton, 63, Middle Abbey-street, Dublin, £5. Further subscriptions promised.—Mr. Gordon Dubhossan, J.P., Fleet Hill, Carlisle, £5; Mr. William Duggan, Dublin-street, Carlisle, £2; Mr. William Bacon, Castle-street, Carlisle, £5; Mr. Horace Backford, s.s., J.P., Clongrass, Carlisle, £4; Mr. R. A. Mitchell, Secretary, Barrow Navigation Company, Carlisle, £1 s.s.; Mr. Patrick Hughes, Baginbown, Milford, 10s.; Mr. James Maher, Clongrass, Gorebridge, 10s.; Mr. John Hayden, Magee, s.s.; Mr. John Bennett, Greenfield,

Mr. Grand Canal Company, Dublin (per Mr. John Kelly, Engineer, agent, &c. &c. & Wilfred Haughton, treasurer); James Kelly, secretary."

You have heard the evidence (Mr. Haughton continued), as to our apprehensions. We have endeavoured to bring all the scientific evidence before you as to what we expect. We are afraid of these fresh floods coming down from the main river, and unexpectantly meeting the same class of floods from the tributaries. If it were competent for me to state my conviction, I would state that I feel it almost as a certainty that it will be so, but how can I convince others. We are very much afraid, and our hopes are, gentlemen, that you will arrive out of this nettle larger to snatch the flower safely. And if I might point out a way, perhaps you would give your attention to it. The Barrow river is a royal river—it is the Queen's highway, for every subject has on it equal rights of transit as on the Queen's highway. Anything that is necessary to be done upon that river, any freely-considered public work—it should not be bounded by a narrow schedule of £ s. d.; it is a great public work. Every man who has a cot has a right to go up and down that river, and no man dare stop him. Certain rights of navigation, and for the carriage of merchandise, have been granted by charter to the Barrow Navigation Company, but all the rights of others are reserved strictly under these charters, and they have, I will say it, been honestly observed. I can speak positively. I don't think a cot owner has ever been stopped going up or down the Barrow; why? because it is a royal river, and as subjects of the Queen every man has a right of transit the same as they would have on the high road. These royal rivers, gentlemen, are, I think, analogous to what are called Imperial roads on the continent, which are State roads, not handed over to the local authorities. On these grounds, gentlemen, if you see your way, and if you entertain the view that I have put before you, it may lead possibly to your recommending a State grant for this work, so that the entire work will not be left chargeable to the district.

2796. Lord CASTLEMAZON.—Mr. Haughton, I think you'd like some evidence. That is hardly evidence. You state that you would wish to have this done as a public work—we will take that down as evidence, but I don't think we want anything more than that. And I gave my reason—that it was a royal river. And there are only four royal rivers in Ireland, so that it would not be creating an injurious precedent.

2797. That is your evidence on that point?—Yes.

Lord CASTLEMAZON.—Is there anything you wish to say further, Mr. Price?

2798. Mr. Price.—I think I have stated everything I wish to say. But I desire to make one remark in reference to what I said at the last inquiry, having regard to the bogs acting as sponges for retaining the water. One of the Commissioners, I think it was Mr. Haugard, if I mistake not, asked me wouldn't I get more water out of a bog by draining it off from a greater depth—no doubt, I quite admit that. No doubt you get more water out of it, but you get it when you don't want it. And I will just illustrate it in this way: if you have a pond, and an opening in it a foot square six feet down, you only take six feet of that pond, but if you make an opening two feet square, eight feet down, you take eight feet off, and the whole pond will run off quicker. I only want to illustrate that now the water trickles out, but when these proposed works are carried out, not only will you have it in greater quantity, but it will come more quickly, and come before it is wanted.

2799. Mr. HAUGARD.—You stated that bogs gave out the water as sponges in the summer, and I said if the level of a bog is lowered two feet, wouldn't you have two feet more of sponge over your level?—I quite admit that; by making a larger aperture in a vessel lower down you will, no doubt, take more water out of it, but more quickly. That is identically what I have said.

2800. That does not meet the case at all—you get two feet more of stratum that holds water?—Certainly, but that stratum has been drained.

2801. But you get two feet greater depth of storage?—But that has been drained before I want it by the greater aperture.

2802. Why should it go off with greater rapidity than before, whether it goes out at four feet or at six feet depth? It does not make any difference?—I have stated my reason for that by the illustration I gave. You also ask what ought to be done in reference to the Lower Barrow; I think as the first instance the drainage ought to be done, but that drainage ought not to be done without taking into consideration certain works which I will generally describe in the Lower Barrow. I cannot give details, for it would take a very minute examination and cross sections to enable me to do so; but there are certain rocks of the river that ought to be widened and deepened, there are certain weirs where there are no mills, that might be lowered.

2803. Lord CASTLEMAZON.—Are these the weirs of the Barrow Navigation Company?—Yes. I think by deepening the upper ends of the reaches the Barrow navigation would not suffer, but that the benefits they would derive from the upper ends of their reaches being deepened—the sills being very deep, generally deeper than the bed of the river—that certain of the weirs might be lowered, and some of them lengthened, which would not affect the level.

2804. That is in order to give greater facility for the flood water to go off?—For the flood water to go off; and certain of the weirs, I think especially at Carlow, ought to be provided with sluices, so that to a certain extent the flood may be as it were anticipated, and these sluices might be opened a little before the flood.

2805. I think that is practically what Mr. Manning suggested for the upper weirs—sluices?—Yes.

2806. And you suggest the same class of thing at Carlow?—Yes. The difference of having sluices in a weir is this—a weir does not discharge until the flood comes down upon you, but the sluices will discharge before the flood, and you in a certain way anticipate the flood. I think that the use of sluices in some of the weirs, particularly at Carlow, would be attended with very great benefit indeed, and would prevent a great deal of damage. I think, generally speaking, I have taken careful soundings and measurements of the river as far as I could, in the short time at my disposal, and I think, generally speaking, that there ought to be a very considerable expenditure on the lower part of the river, both to keep up the navigation and to prevent the possibility of injury from floods. Of course, I do not contemplate in this case such an expenditure as would entail any very large scheme or any very extensive outlay.

2807. To keep up the navigation?—To maintain the navigation and to discharge any extra floods, and at the same time I think that by deepening some of the levels, the relief from backwater would relieve the millers in that way, and compensate them to a great extent for their loss of some of the summer water.

2808. Therefore you anticipate, for a certainty, a loss of some summer water?—I do—of some of the summer water.

2809. And how do you propose to compensate them for that?—I think that the very works that would be necessary for letting the floods off would leave them with better falls and less backwater. Exactly the same thing is being done, under my own direction, with reference to Mr. Haugard's mill. I have no doubt that he has less water, but the works that the Drainage Board are doing, at my suggestion, will give him less back water, and therefore what he loses in one way he will be compensated for in another. Of course I did not take into account the relief of flooded lands all down along the Lower Barrow. It would take a very much more extensive kind of works than I have in my mind to relieve entirely all the

August 2, 1885.  
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Mr. S. Wilfred Haughton.

August 3, 1882.  
Mr. S. Wilson  
Houghton

flooded lands all the way down, but they might be relieved greatly at Carlisle, Greenbridge, and Leighton Bridge. Some of the bridges would require to be rebuilt, but I should think that that is a matter entirely for the County Surveyor; they don't affect sufficient waterway.

2810. You represent a good many of the owners in the Lower Barrow district, of course?—Yes.

2811. And you think that the works done there would not relieve them?—Oh, certainly not—it would be a very costly drainage scheme that would relieve all the lands along the Lower Barrow.

2812. That is the flooded lands below Carlisle?—Yes.

2813. Mr. BARNES.—When you speak of relieving lands, do you mean to relieve them from excessive water which would be produced by the works above, or do you mean to relieve them from the floods which they at present suffer from?—Oh, I only propose to relieve them from excessive water.

2814. Lord CARMARTHEN.—That is the excessive water produced by the drainage works?—Yes, I think it would take a very large expenditure to relieve the lands below entirely from floods. According to the sections which I gave to-day you would have to make a channel to pass 550,000 cubic feet of water, and the channel only passes now 150,000 cubic feet. It would be a tremendous work.

2815. Whereabout is the most congested point?—I think the worst points are from Milford Lock to Leighton Bridge, about two and three quarter miles, and from Ragenstons to Finsbury, about two miles.

2816. These are the two most congested portions?—Yes, and Carlisle. There are other portions, but I took those specially because I have better levels. I didn't go down for the purpose of taking the actual levels, but from the notes I had I was able to give the calculations. There are other congested portions at Leighton Bridge and below it again.

2817. Is the river congested there from the banks being close together and the river shallow, or from bridges and weirs?—From bridges and weirs and from those islands you heard of. The portion I have given is just above Leighton Bridge. As I say there are several other portions, but I give those simply because I had the measurements of them.

2818. Sir JOHN McKENNA.—Is there much land flooded on those reaches?—Yes, I have marked it roughly on the Ordnance map.

2819. Will you let me look at it?—I have only marked it in pencil (shows map marked).

2820. Isn't there a great deal more flooded land above Milford?—Of course, it is all only roughly marked—but it lies all along there (points to map).

2821. You don't think that the flooded lands are the great interest on the lower Barrow?—No. Of course embankments could be made there, but every part of the river would have to be dealt with in a different manner.

2822. Mr. HARRISON.—Am I to take it that 8,000 cubic feet per minute was the amount of water passing at Ragenstons mill?—10,000—I said the other day, I think.

2823. Eight thousand I took it to be?—I said roughly 8,000 to 10,000 cubic feet I think you will find.

Mr. MANNING.—It all depends on what is the amount of the summer discharge.

2824. Mr. HARRISON.—I mean the occasion on which you said that every drop of the summer water passed through the mill wheel?—Well, I estimated that at from 2,000 to 10,000 cubic feet per minute. I made some measurements when I was down at the weirs, but they were too dirty to give very accurate results.

2825. Could you tell how many pairs of stems they had going?—No—they work rollers now though—not stems.

Mr. Houghton.—Messrs. Brown and Crosswell's mill is reputed as being 100 horse-power.

Mr. MANNING.—Can you state the fall?—

2826. Mr. Price.—At Ragenstons the fall is eleven feet two inches—when I was there.

2827. Mr. Houghton.—If you give ten horse-power for each foot you will be about right.

2828. Mr. Price.—That was the fall of the lock which I took.

2829. Mr. BARNES.—You began by saying you proposed certain protective works below Ayley?—Yes.

2830. And you mentioned sluices in some of the weirs?—Yes.

2831. Now would it not be necessary to put them in all the weirs—wouldn't the effect of putting sluices in one of the weirs throw a much larger quantity of water on the weir immediately below it?—It would, but I think that each case might probably be met according to the circumstances, by widening and deepening some of the weirs. Sluices you see are very expensive things and they cost a good deal for maintenance and management. I certainly would not go so far as to say every weir ought to have sluices—only where towns such as Carlisle are flooded and where it would be a sanitary matter. At Carlisle, Greenbridge, and such places, I think sluices ought to be adopted.

2832. I wish to ask you specially about the sluices proposed in Carlisle weir, and the next weir below it? I think it Milford?—Yes.

2833. Does there not exist at Milford a very congested part of the river—a very narrow bridge with a very small waterway?—Yes.

2834. And the public road is carried over the river by the bridge?—Yes, there is a very rapid fall from the bridge at Milford.

2835. And that bridge and those weirs forming obstructions to the river above that fall would not the effect of putting sluices on the weir at Carlisle be to produce a considerable amount of flooding in the reach between Carlisle and Milford unless you provided an escape for that pressure at Milford?—Certainly, but I think you might meet any effect of that kind by going down step by step—reducing any one level and then reducing your back water. I dare say some of the wheels would have to be altered in position by reducing the upper water to the mill and the lower water from the tail, bringing it down step by step. It would avoid that effect which you point out, provided the canal would bear it, and I think it would bear it. I think the canal would bear letting many of those weirs be lowered one foot and yet be perfectly navigable—it being begun at the upper end where deepening would be necessary for the discharge of the floods. The sluices in nearly every case considerably deeper.

2836. I think you also told us that the works which you suggest would be of no use to relieve the flooded lands on each side of the lower Barrow—or very little use?—I don't think they would.

2837. And don't you think that those who have interests in those lands to be protected, ought to be protected as much as any other interests?—Of course, some of the land is very valuable. There is not very much land flooded along there, but some of it is very valuable no doubt.

2838. But you have not suggested any means whereby those interests could be protected?—Oh yes, by general works of deepening and widening the channel; of course that protects those interests.

2839. Would it be sufficient to protect those interests?—Oh, certainly, but a larger scheme of works is not in mind at all.

2840. But what is the scheme of works which you say would relieve those interests?—The deepening and widening of certain reaches of the river; the lowering of certain weirs, and the putting of sluices in others, the widening of bridges and the underpinning of some of them. In fact in the whole of those works

what would be to the advantage of one would be to the advantage of all the interests.

2841. Have you gone particularly into these works?—Not sufficiently to state details—it would take a very much longer examination than I have made.

2842. Have you made any estimate as to what their cost would be?—No, but it would be a very large cost.

2843. Mr. Houghton.—You asked a question, Mr. Price, about the carrying down of the silt from the river Barrow by the drainage, and its effects on the river Barrow. I am personally aware of the accumulation of silt in the river Barrow where the Barrow discharges itself. My uncle, Mr. Samuel Houghton, of Carlisle, made a mormatite wharf below the weir. I remember seeing it built and heavy loaded boats with timber used to come up to that wharf. Well, it is a shingle bed now. I distinctly remember after the Barrow drainage was finished the difference in the sand which came down—it was granite sand that came down from the mountain districts, and it rapidly accumulated and caused a large obstruction.

2844. Mr. Manning (to Mr. Price).—Without saying anything of the actual amount of the flood waters going down at Athy, what do you think the effect of the works would be in increasing that—that is to say at the junction of the floods meeting—what per centage?—I should say, probably about twenty per cent, that is of course in the nature of a conjecture, but I think it would be something about that.

2845. Mr. Percy La Touche.—Before Mr. Price goes, just a word with reference to the evidence of Messrs. Brown and Norton respecting the obstruction of the traffic owing to the boats not being able to, as slight, travel in the dry season in consequence of the silt up of the river. Of course I quite admit that the boats are not able to travel, but I don't think they stated the reason correctly. We of the Barrow Navigation Company do not find that the river itself is silted up to any appreciable degree, and the fact of the river is, that the boats of the Barrow Company were altered and cannot carry as much as they used. Messrs. Brown and Crosthwaite are supplied by the Great Canal Company's boats, not the Barrow Navigation Company's, and they are not capable of carrying as much tonnage as the Barrow Navigation Company's boats. As to the islands, Mr. Watson referred to a new island before Loughlin Bridge. Well, that is an old island which existed in 1835. It was removed by the company then for the purpose of clearing the channel and making it easy for the boats to go across the river from below Loughlin Bridge. Now, I admit it is facing again, and probably it will have to be removed again.

2846. Lord CASTLETOWN.—Is it part of the duty of the Navigation Company to remove those sort of islands?—According to our Charter we are not bound to keep the river at any depth.

Mr. William Dorell examined.

2847. Lord CASTLETOWN.—You wish to be examined about the valuation?—Yes. I say that there has been an overcharge with reference to Hackins, in the Queen's County. You will find it mentioned at page 2 of the schedule for that county. There are some tenants of mine upon those lands, and their rents have been fixed by the Land Commission. These rents were reduced on account of the flooding, yet no change has been put upon the tenants. It is all placed on me.

2848. How do you mean the charge put upon you?—The whole of the proposed increased value—£34 17s. 4d.—is put upon me, and no charge is put on the tenants.

2849. And their rents have been fixed judicially?—Yes.

2850. Is the acreage put down right?—I think the acreage is right.

2847. Have you got your Charter here?—Yes.

2848. Would you mind sending in a copy of it?—Yes, I will,—it is in print and I think I have another copy. We are bound to maintain the navigation, but there is no specific depth stated.

2849. Have you got the words there?—Yes, it states that we are to maintain the said navigation, but does not say at what depth the water is to be maintained, and really the shallow places which interfere with the navigation and prevent our carrying full loads in the summer time, as you will see by Mr. Price's soundings, are places where there are rocky beds, and are not the result of the silting up at all. We expended a great deal of money in blasting with dynamite to get rid of some of that very rock, and so improved the channel.

2850. Mr. Price.—That is so. I cannot say that the silting has reduced the general carrying power of the river because there are rocky shoals which of course limit the draught of the boats, and I don't know what reason the witnesses have for saying that they used to carry more except that the water was maintained at a higher level formerly than now. I cannot say whether in former times the water was kept at a higher level at the weir, but I could see no sign of that having been so.

2851. Mr. La Touche.—With the exception of last season, which was a very dry one, we find on looking over our records that the amount carried by our boats has not been lowered.

2852. Mr. Price.—Certainly these shallows are hard as a rule and were never removed out of the river.

2853. Sir JOHN McKESSER.—Those interested in the navigation of the Barrow know its nature, and at these points it is practically as it was at first constructed.

Mr. Price.—Yes.

2854. Sir JOHN McKESSER.—Those shallows regulate the traffic of the whole river—and practically they are not in a worse position than they were before.

Mr. Price.—And some of the shallows are in the upper part of the level where the silt would not be likely to rest. It has just been suggested to me by Mr. Watson whether the weirs have ever sunk. I don't know whether they ever subsided.

2855. Lord CASTLETOWN.—For what purpose was the board placed on the top of Cuckoo weir?

Mr. Price.—I think for mill purposes.

2856. Mr. Houghton.—To give additional fall—to take full advantage of the river for the mill power—and it confirms what Mr. Browne stated, that the summer water is more valuable to the mills than the winter water—for they are able to work full power in the summer—and the wheels are not retarded by back water. They are always able to move at the requisite speed, and the slightest back water interferes with them.

2861. The total is about 200 acres?—Yes. All I want is that the tenants should bear their fair proportion, for they only will receive the benefit.

2862. You say the rents were specially reduced on the ground of the lands being flooded?—Yes, on account of being flooded lands. Some of the tenants down there have asked me to bring before you the suggestion that the time for repayment of the charge should be extended from thirty-five years to fifty years. I believe thirty-five years is the time in which the charge is to be repaid.

2863. Can you tell whether the tenants have stated to you that they are willing to pay a rate supposing a rate is struck?—No, they have not stated that.

2864. But apparently they have indicated that by stating that they wish the charge extended to fifty years?—Yes. At the end of my land there is a weir made of sticks and mud, and the effect of that weir is

August 7, 1906.  
Mr. S. WILKES  
Houghton.

Mr. William  
Dorell.

August 1, 1855  
 Mr. William  
 Bennett.

that it throws back whenever there is the slightest rain two or three feet of water on the lands above. There is no way of letting the water off.

2865. How is the weir there?—It is right across the whole river for the purpose of the mill.

2866. What mill?—Watson's mill. It is a very small mill.

2867. Mr. Manning.—I have provided for that. If the mill is not worth putting in a new weir for we will purchase the mill.

2868. Watson.—I think it would be better to purchase out the mill. I think you could get it for a very small sum.

2869. Lord CASTLETOWN.—You have with regard to your lands no objection to the valuation or to the

proposed increase for the improvement—all you object to is to the charge being placed on you solely?—Yes, on me solely.

2870. Mr. HARRARD.—Since this question of the Lower Barrow has dropped up, I propose to go down myself and visit the locality, and as Mr. Manning is going down for the Board of Works I think it would be well if I went down with him.

2871. Lord CASTLETOWN.—The only question is how low down the river you will go.

2872. Mr. HARRARD.—I will examine it far my own information the whole way down till it joins the Neen.

The Commission then adjourned till a future date to be named.

Oct. 26, 1855

### WEDNESDAY, 28TH OCTOBER, 1855.

The Commission met at La Touche's Bank premises, Castle-street, at 1 o'clock.

Present:—The Lord of CASTLETOWN, Chairman (presiding); Colonel Sir JOHN McKEHLIE, Colonel CARMEN, D.L., Mr. JAMES A. CASSIDY, J.P., and Mr. RICHARD HARRARD, C.E.

Mr. PENNY, Secretary to the Commission, was in attendance and read the following correspondence:—

No. 84.

Barrow Drainage Commission,  
 La Touche's Bank,  
 Dublin Castle, 10th August, 1855.

Sir,—I am directed by the Barrow Drainage Commissioners to state that from the evidence taken in regard to the milling, navigation, and other interests below Athy, and the alleged anticipated injurious effects which the proposed works would have on those interests, it has become necessary that an examination should be made of the lower portion of the River Barrow, and I am to request that your Board will be good enough to instruct your Chief Engineer, Mr. Manning, to make the examination referred to.

I am, Sir, &c.,  
 (Signed), JAS. S. PENNY.

The Secretary, Board of Works,  
 Customs House.

No. 8322-85.

Office of Public Works,  
 Dublin, 11th August, 1855.  
 BARROW DRAINAGE.

Sir,—I am directed by the Commissioners of Public Works to acknowledge the receipt of your communication of the 10th instant, relative to the examination by the Board's Chief Engineer of the lower portion of the River Barrow, and to state that Mr. Manning has been instructed to meet the wishes of the Barrow Drainage Commissioners.

I am, &c.,  
 (Signed), W. R. SOADY, Secretary.

The Secretary, Barrow Drainage Commission,  
 Dublin Castle.

No. 11191-85.

No. 126.

Office of Public Works,  
 Dublin, 17th October, 1855.  
 BARROW NAVIGATION.

Sir,—I am directed by the Board to refer to your letter of the 10th August last (No. 84) and to their reply of the 11th August, and to transmit, for the information of the Barrow Drainage Commission, the annexed copy of their Chief Engineer's report.

I am, Sir, your obedient servant,  
 (Signed), W. R. SOADY, Secretary.

The Secretary, Barrow Drainage Commission,  
 Dublin Castle.

(See Appendix for Mr. Manning's report on the Lower Barrow.)

2873. Mr. HARRARD, c.e.—I thought that probably your lordship and the members of the Commission might wish to have my views on paper upon the whole question, and since the last evening I have gone very carefully over the whole of the evidence, and have considered all the questions with relation to the Upper Barrow, and also with relation to the district of the Lower Barrow. I have put my views on paper, and if you please, after you have gone over Mr. Manning's report I will read those which you can have printed or deal with as you think best.

2874. Lord CASTLETOWN.—Meanwhile I will read the report furnished by Mr. Robert Manning, c.e., "to the Commissioners of Public Works in Ireland on the present state of the River Barrow between the town of Athy and St. Mullins," dated October 13th, 1855, and you may stop me when I come to any passage you wish to draw attention to:—

"On my arrival at Carlow on the 4th ulto, Mr. Mitchell Secretary to the Barrow Navigation Company, freely placed at my disposal such documents and drawings as he considered would be of use to me in the course of my inspection, and very kindly accompanied me on the following day on my examination of the river from Carlow to Goresborough."

"One of those drawings consisted of plans and a cross-section of the entire navigation made in the year 1813 by Mr. John Molloy, and the other a book of tracings made in the year 1843 by Mr. Molloy from the Ordnance Survey, with soundings taken from one end of the navigation to the other."

"It appears from Mr. Boyle's (Molloy's) survey that the depth at Athy lock pass bridge, and Athy Mill was 2 to 4 feet, which was proposed to be deepened to 5 feet."

How was that proposed to be deepened?—was it proposed to be deepened by the Barrow Navigation Company for their own purposes?

Mr. HARRARD, c.e.—I think, so far as I understood the report my lord, that that relation to contemplated improvements.

2875. Lord CASTLETOWN.—By the Barrow Navigation Company?

Mr. HARRARD, c.e.—I presume so.—I presume that the means proposed by the Barrow Navigation Company.

2876. Lord CASTLETOWN.—

"Through Ardara Canal from 4 to 7 feet, at Levensham it was from 3½ to 5 feet, at the junction of the Grace river 2 feet 8 inches to 5 feet, opposite the Larr river from 3 to 4 feet, with various shoals in the river. Down to Bessborough the river was from 2 to 2 feet deep, but below the lock there was an accumulation of sand and gravel, over which there was only from 2 to 3 feet of water. At Carlow a shoal is shown above bridge, with 4 feet of water over it, and makes a river, with depths from 2 to 10 feet."

Mr. HARRARD, c.e.—That shoal is now a large island covered with osiers.

2877. Lord Castletown.—

"Down to Claghrenna mill, there were several shoals, and only 3 feet 6 inches, where a lock was proposed, but afterwards built in short distance above it; and above and below Millford lock were shoals, depth of water 3 feet."

"A and line is drawn about 9 feet above the water surface, which from remarks on the section I take to be a proposition for raising the water, so as with the necessary cuttings of shoals to have a regular depth of 5 feet."

"On Mr. Mulvaney's readings (1833), the depth from Athy bridge to the junction of the Grand Canal is from 3 feet 6 inches to 4 feet."

Mr. HARRARD, C.E.—That is now 1 foot 6 inches to 3 feet—with a maximum depth of 3 feet in some places. It shows how the river has accreted.

2878. Lord Castletown.—

"In the Ardara Canal is from 3 feet 10 inches to 5 feet 6 inches, to Leinstown from 3 feet 10 inches to 5 feet 2 inches. Down to the junction of the Larr river the depths were from 3 feet 10 inches to 5 feet 1 inch, and above and below that point islands are shown in the river. Down to Colrow the least depth shown is 4 feet, to Millford 3 feet 11 inches to 5 feet, an island is shown in the river between Mortinstown and Claghrenna, and two others between the last named place and Millford."

—I suppose these are all shoals!

Mr. HARRARD, C.E.—There are such a number of shoals in the river, I don't recollect the particular places—Claghrenna, all down there, there are nothing but shoals.

2879. Lord Castletown.—

"Below that there are some shoals with a depth of only 5 feet of water over them, but generally the depths shown are from 4 feet to 4 feet 6 inches."

"It must be observed with regard to these two surveys that the soundings were taken on the milling course of the Navigation, and do not represent the state of the river for its full width. Mr. Mulvaney, however, gives a transverse section in the Ballyvella Canal, which shows that (more than thirty years ago) it had become filled with mud and more than half its original capacity, he also proposed excavation in the Rushingra and Shaght canals, and the removal of a shoal immediately below Leighlinbridge."

"To enable me to report on the actual state of the part of the river now under review would involve a detailed survey both of the river itself and the land adjoining it, which are subject to floods, this would take a very considerable time, and in my opinion is not necessary at present."

—That is the whole project.

Colonel CAMBER.—That is what I thought he would report upon.

Lord Castletown.—Yes, I was under the impression that that is what he went there for.

2880. Sir John McKEELIN.—Of course. He shows here what the state of the river was at that time; he does not say what it is now, but we are led to infer from the statement made that at Colrow particularly and also at Athy it has very much filled up, which is corroborated by Mr. Heward. And turning upon that in the question of injury that they complain of, and from which they suffer.

2881. Lord Castletown.—And also the fact of a possible danger if an increased volume of water was met down.

2882. Sir John McKEELIN.—Yes, without those obstructions being removed—without his being restored to the position it was found in in 1833 at all events.

2883. Lord Castletown.—

"Speaking generally I may say that the state of the lateral canals and of the river itself fully bears out the opinions expressed by Mr. Mulvaney then sixty years ago. Such islands and shoals as existed seventy-two years ago still remained and had increased in size forty years later when Mr. Mulvaney made his survey, and in places where Mr. Mulvaney showed only reefs or rocks in the river, new shoals have been formed."

"During my inspection I observed this progress of gradual accretion going on in many instances, I found behind me, 6 or 7 feet long growing in the river, which will no doubt form in each case a nuisance for a new shoal; I also found that the banks and discharging line of the several weirs were not kept clear, and in one instance at Colrow the river was raised 6 inches by boards permanently fixed on

the weir. I also observed at several points on the river the weeds of old canal basins which undoubtedly cause an increase of the evils already described."

"I have been furnished by the Secretary to the Commission with a copy of the Charter granted to the Barrow Navigation Company in the year 1790, conferring them to the soil and water of the River Barrow, together with the banks thereof, and such other portions of ground as the Commissioners of Island Navigation were by any law or usage theretofore entitled."

"This Charter makes no provision for the maintenance or conservancy of the river channel in regard to other interests besides those of navigation; nor does it, so far as I can see, place any obligation on the Barrow Navigation Company to execute any works for such purposes."

—We have got a copy of that charter, I presume!

The Secretary.—We have. Mr. Percy Le Toocoe furnished us with a copy of it.

2884. Lord Castletown.—

"The Company may therefore demand that no works for the improvement of the river above Athy shall be undertaken, which may injure their property, and they may maintain that they are not bound in any way to incur the cost of maintaining the river beyond what is necessary for the purposes of navigation. On the other hand the argument is advanced that the Navigation Company must use their own property so as not to do injury to their neighbours, and that notwithstanding their Charter they are still bound by the common law maxim 'sic utere tuo ut alienum non laedas.' I am not competent to discuss such questions, nor as an engineer, called upon as I have been to consider all interests without unduly advocating the claim of any one in particular, would it become me to give an opinion one way or the other. I shall, therefore, confine myself to stating my opinion of what should be done to improve the present state of the river—course from Athy downwards—and in the first instance I shall do so on the supposition that no works whatever are to be executed above Athy."

—This is the passage in the whole report that puzzles me most.

2885. Sir John McKEELIN.—What he means to say is, supposing that the Barrow drainage is not carried out that still the Barrow Navigation Company should be called upon to improve their navigation.

2886. Lord Castletown.—Oh, I see—that is the meaning of it—(continuing to read)—

"First—The discharging line of the weir should be cleared of obstructions of all kinds, the weir themselves scoured, and the weir houses cleared out."

"Secondly—The shoals in the river should be dredged out, and where they have appeared above water in the shape of islands with sedge or other vegetable growth upon them they should be removed, especially where, as at Leighlinbridge, they obstruct the free discharge through the bridge."

"Thirdly—The towing paths where they serve as embankments to the lands should be raised to the proper level, and the back drains behind them kept in order."

"Fourthly—At Bagninstown where the water in the Company's canal is at a high level—only a little below the floor of Mr. Crutwick's mill and of some maling doors—shoals should be placed in the navigation weirs; and the canal bank trees close to the mill should be raised and strengthened where necessary."

"Fifthly—At Leighlinbridge where the low parts of the town are flooded some extensive mill houses have been recently erected by Mr. Watson, who has taken the precaution of raising the floor from 18 to 24 inches above winter floods. Particular care should be taken in making a complete survey of the river at this place, and works should be undertaken so as to make it of sufficient capacity to discharge floods which for the last thirty years at least have risen 7 feet or more over the ordinary winter level of the river and have done considerable damage, rendering the dispensary, police barracks, and other houses undesirable, as stated to me by the Dispensary doctor."

—That is evidence that we never got hold of at all I think. We never went down so far as Leighlinbridge.

2887. Mr. HARRARD, C.E.—No, we did not.

2888. Lord Castletown.—

"Sixthly—At Colrow scoring shelves should be placed in the weir, the permanently fixed boards should be removed, and should be replaced in the interest of the mill power with movable boards, which could be quickly lowered when not required."

2889. Mr. HARRARD, C.E.—Though the weir was drowned by the flood of 1879 there was something like

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2 feet difference of level between the water above and below the weir according to the flood-marks pointed out to me when I was down there.

2890. Sir JOHN McKEER.—That is, there was high water on it, but the flood above it was higher. When I spoke of a drowned weir there was one, I remember, on the Shannon—World's End weir. I meant where the water below was as high as above.

2891. Mr. HARRIS, C.E.—The real meaning of a drowned weir is where the water below rises above the crest of the weir itself.

2892. Sir JOHN McKEER.—It is a question of degree, because it may be so drowned as to have no fall at all. In the case of the weir on the Shannon to which I refer for instance, you could not tell there was a weir there at all.

2893. Lord CASTLETOWN.—

"Sincerely—Some conservancy authority should be created, which would have power to cause the removal of all works of boats and other obstructions to the free discharge of floods.

"In the absence of a complete survey I have been unable to do more than to describe in this general way the works which I consider necessary for the improvement of the river. As to the question of the incidence of their cost it is beyond my province, and I therefore leave it for the consideration and decision of the Commission.

"The physical features of the Lower Barrow are very different from those of the upper district as described in my report of the 12th June last. In the lower district the valley of the river is narrow, the quantity of land flooded is comparatively inconsiderable, the catchment varies in width from 3½ to 17 miles and the fall varies from 2 feet to 2½ feet per mile.

"Above Athy the average width of the catchment for its whole extent of 307,280 acres is 90 miles, and the fall in the river from Monasterevan to the navigation weir below Athy bridge—a distance of about 16 miles—is 50 feet or 1½ inches in the mile. I have described this district in my former report. I have attended the meetings of the Commission on five different occasions, when I was examined by several of its members, and by gentlemen interested in the district. I have listened attentively to the several statements made by those gentlemen and their engineers in support of their views in regard to the several interests mentioned at the beginning of this report, and I have since carefully considered them, so far as my judgment guides me. I cannot conceal in the apprehensions expressed as to damage being done to the lower district by the execution of the proposed works in the upper one, and I therefore beg leave to adhere to the opinion which I have already expressed, and in which I am confirmed by the examination I have made of the lower district and the facts which I have collected with respect to the discharge of the river, its mill power and navigation.

"To enter into a discussion of all the grounds on which my opinion has been founded would oblige me to extend the report to an unmanageable length, and would in fact partake more or less of the character of a treatise on internal drainage, navigation, and mill-power.

"One of the members of the Commission is an eminent hydraulic engineer to whom I shall be very happy to give any further information in my power if he requires it."

2894. Sir JOHN McKEER.—Well, the result of all that is that he amply holds to the opinion he has expressed as to the effect that will be produced by the drainage of the upper district.

2895. Lord CASTLETOWN.—But he suggests, and I suppose he suggests with a view to possible damage, that there should be a removal of a large number of those obstructions.

2896. Sir JOHN McKEER.—Yes, but he goes beyond that and speaks of the improvement of the river channel altogether, with a view to improving the mill power, or it may be the condition of the towns, so far as they are under its influence.

2897. Mr. HARRIS, C.E.—To increase the discharging power of the river, I take it. I have prepared a report upon the whole question both as to the Upper and the Lower Barrow.

2898. Lord CASTLETOWN.—Would you mind reading it?

2899. Mr. HARRIS, C.E.—I will with pleasure. I

went through all the evidence very carefully in the interval between our last meeting and this one. (Reads report).—

"Silver Barrow Drainage.—The Upper Barrow or Athy carries off the drainage of 498,000 acres, the level of the ground there being about 200 feet above the sea in low water.

"The channel of the river for its whole length above Athy is in a lamentable condition, being obstructed by natural shoals and islands, banks of silt and islands in course of formation, great growths of aquatic plants, fallen trees, insufficient bridges, mill and fish weirs, &c. It appears to be daily getting worse, and the bed of the river to be gradually rising, so embankments which have here and there been made at its sides to keep out flood water, and which are stated to have been effected at the time of their construction are now periodically submerged, this however may to some extent be caused by water from the Rathfriland district, consequent on the completion of the drainage works there, being brought down more rapidly than before.

"Out of the total drainage area of 608,000 acres, 328,000 acres lie below the 100 feet level, most of it indeed not attaining to 300 feet—the only elevated land in the district being to the west of Monasterevan, adjacent to the sources of the river Barrow and the Gressan Stream, where there is an area of about 3,000 acres above the 1,000 feet level, attaining an extreme height of 4,677 feet.

"With this exception the drainage area is extensive and flat land, the shallow depressions in which the watercourses are being separated by the tracts of bog, and cultivated lands of low elevation and gentle undulations. The geological formation of the whole basin, excepting the 3,000 acres of elevated land, where the Old Red members appear, is boulder drift, soil gravel, of an absorbent nature, covered in parts by the tracts of peat bog to above mentioned.

"It is clear, under these conditions that rain falling on the surface, can find its way, consequently soaking, but slowly into the strata, and this will be the case after the enlargement and deepening of the outfall channels.

"The catchment basin is divided into upper and lower districts, lying respectively north and south of Monasterevan, where one of the principal obstructions is situated. The lower district has an area of 116,000 acres, or about two-sevenths of the whole, and the streams draining it deliver their waters into the river Barrow about five miles above Athy.

"Under ordinary conditions of rainfall, the flood water from this district would be the most part have passed away, before that from the upper district had come down, and it would be only in the case of prolonged rain, or in that of a second flood being caused by a heavy fall of rain occurring at a short interval after a preceding one, that the whole district would be sending down flood water simultaneously.

"It was stated in evidence, that maximum flood at Athy, distant only 47, 42, 50, and 38 miles respectively, at the Silver Bloom Mountains, at Philipstown, at Abbeyglough and at Prosperous, from the most remote sources of the streams, the confluence of which north of Monasterevan forms the river Barrow, does not occur, until about a week after the commencement of the rain which causes it, and that the accumulated water, due to the flooding of the land above Athy is not discharged in less than a fortnight, or 324 hours subsequently, supposing that no further rain fell.

"These facts coupled with the naturally flat configuration of almost the whole drainage area, and its absorbent nature, induce that after the completion of the drainage works, water would still continue to flow but slowly off the land into the improved outfall channels, and that the floods from the district would be neither sudden nor violent, nor so sudden they would commence earlier and be of shorter duration than at present, as the same quantity of water would be sent down past Athy in less time than now occurs.

"By Mr. Fitzgerald's report the flooded lands, apart from the watered lands, have an area of 22,873 acres (about one-eighth of the drainage area), and it was stated in evidence that they are submerged to an average depth of about one foot over the whole area—394,435,060 cubic feet. This is equivalent to 473, or two-thirds of an inch fall of the ground from 608,000 acres; but this depth of accumulated water simultaneously with maximum flood at Athy, is not attained until about one week or 167 hours after the commencement of the fall of rain by which it is caused. Under these circumstances, therefore, the water accumulation on the flooded lands at an average rate of 98,833 cubic feet per minute over and above the quantity the river is simultaneously discharging.

"Of the above-mentioned 394,435,060 cubic feet of accumulated water the proposed new and enlarged channels for the Barrow and Fiddle rivers, as laid out by Mr. Manning, would contain up to future flood level 185,000,000 cubic

\* See Appendix.

fact, or, if calculated for a flood discharge of 320,000 cubic feet per minute at Athy, 134,000,000 cubic feet, leaving 86,415,000 cubic feet of water to be got rid of, and prevented from flowing over the lands. If this had to be carried off in 120 hours, which would be the duration after the completion of the Drainage Works, probably by the duration of flood caused by continuous heavy rainfall for two consecutive days, it would be discharged at an average rate of 117,000 cubic feet per minute.

From observations made by me on the ground and the fall of the river, as given by Mr. Manning, it is evident that at Killybeg, about 2½ miles above Athy, the river is not capable of carrying off more than about 180,000 cubic feet of water per minute without overflowing its banks, and that when it has risen in heavy flood to a height sufficient to submerge the lands adjacent to its banks to a depth of three feet, it is then discharging about 300,000 cubic feet per minute = 45 cubic feet per acre per minute.

That is about half a cubic foot per acre per minute.

"The River Barrow Drainage District adjoins that of the Barrow, and is of similar character, consisting of cultivated lands of low elevation and gentle slopes, alternating with fast peat bogs, and at the south-eastern corner of the drainage area there occurs—as in the Barrow basin at its south-eastern corner and adjoining it—a small district of elevated land in the River Barrow Mountains of the Old Red sandstone formation, 7,000 acres in extent lying above the 1,000 feet level. The two districts compare thus:

Total drainage area.	Area of elevated land.	Proportion of elevated land to the whole.
River Barrow, 255,228.	7,000 acres.	1/36th
River Barrow, 608,081.	2,000 acres.	1/30th

"The Barrow district lies to the north-west of the Barrow basin—the mean distance apart being about 22 miles—and the rainfall there is probably somewhat greater than in the Barrow district. I assume it, however, to be the same in both places.

"It is well known that, under similar conditions, the flood discharges from large districts are less in intensity than from those of smaller areas, and the greatest observed flood discharge in 50 years from the Barrow district at Fethame, as given by Mr. Manning, was 263,471 cubic feet per minute, or 912 cubic feet per acre per minute. This occurred on the 7th January, 1851, there having been a rainfall of .86 of an inch on the previous day."

"The next greatest flood discharges having been as follows:—

Year.	Cubic feet per minute.	Cubic feet per acre per minute.
1852.	250,000.	784
1854.	312,000.	791
1877.	330,000.	826
—	310,000.	787

"It will be seen from the above returns that, in a period of 30 years after the completion of the arterial drainage works, floods exceeding a discharge of 90 cubic feet per acre per minute occurred three times only, and that as two out of the three occasions the excess was very slight—indeed, in 25 consecutive years—from 1853 to 1877—it may be said not to have been exceeded.

"It is remarkable that in June, 1857, a rainfall of 2.99 inches in 24 hours was observed at Tullamore, in the centre of the drainage area, and that that is the greatest recorded fall; but as the flood of 320,000 cubic feet per minute occurred on the 1st of January of that year, this excessive rainfall does not appear to have produced any great flood, and it was probably the result of a local transference.

"Although no positive rule or formula has in this subject been arrived at, I am of opinion, taking into account the geographical position and similar conditions as regards elevation and configuration of both drainage areas, and the circumstance that the Barrow drainage area is 45 per cent. greater in extent than that of the Barrow, that the heaviest water floods in the former will not exceed 80 cubic feet per acre per minute. This will be equivalent to a discharge of about 320,000 cubic feet per minute at Athy.

"I consider, therefore, that, if provision is made for this flood discharge at Athy, it will be ample and sufficient to protect the now submerged lands from the serious inundations to which they are periodically subject, and from all but those rare and exceptional floods which take place only at widely distant intervals of time, which occur in winter, and would then submerge only a small area for a short period, when comparatively little damage occurs, and

which, being produced by rainfalls of two inches and upwards in 24 hours, it would be occasionally impossible wholly to neutral.

"No doubt, if the information given, and the flood marks pointed out to me at Athy were correct, there must have passed down the river there for a short period, during the great flood of September, 1878, something like 400,000 cubic feet of water per minute; but this was caused by the enormous rainfall of 4.50 inches in 24 hours as registered on the 7th at Portlough (1.65 inches having been registered at Clowry on the same day), preceded on the 6th and succeeded on the 8th by rainfalls of .98 and .25 inches respectively."

2500. Lord CASTLEMEW.—Three and a half inches of rainfall in two days!

2501. Mr. HANNAH, C.E.—Yes. And on that same day—the 7th of September, at Rinekilken, on the same parallel of longitude as Tullamore, but 80 miles distant, the registered rainfall was 1.40 inches, so that this great rainfall would appear to have been general over a very large district. I wrote to Mr. Brown, who got me this information as to the local rainfall—I could not believe in this 3.93 inches of rainfall at Tullamore, and thought it was a clerical error, for 1.40 which would agree nearly with the Clowry rainfall, but he made inquiries and found that it was quite correct. (Reading continued).—

"I am of opinion that the drainage of the Upper Barrow basin cannot be properly carried out without removing the local navigation weir at Athy, and the track bridge immediately above it, the short reach of the river between Athy and Ardrinack being deepened and utilized as part of the navigation. This will entail the construction of a new double-lift lock in lieu of lock No. 24 on the Grand Canal connecting it with the river Barrow, which will greatly facilitate traffic between the two navigations, and steam being substituted for water power at Ardrinack Mill. By this arrangement the Deke's weir at Athy may be removed and a new one constructed at three feet lower level, the same fall as now exists being preserved at Mr. Hanson's Mill by lowering the driving machinery and still race three feet, the removal of the track bridge and navigation weir allowing this to be done."

2502. Lord CASTLEMEW.—That is the track bridge at Athy—just below Athy!

2503. Mr. HANNAH, C.E.—The track bridge is a bridge for the transit of horses.

2504. Lord CASTLEMEW.—Yes, I know—it is the old one at Athy!

2505. Mr. HANNAH, C.E.—Yes, just below Athy. (Reading continued).—

"But the new weir with its auxiliary sluices will be a costly work and the sluices will require attendance and supervision. Under these circumstances, as this mill as well as Ardrinack mill is greatly impeded by back water in winter and suffers from short water in summer, it is a matter for consideration, whether it might not be better to incur the cost of substituting steam for water power in this case also, instead of erecting a new weir and sluices, and lowering the driving machinery and still race.

"Mr. Manning's estimate of £474,694, including the purchase of land and property, compensation, contingencies, and professional charges for superintendence, &c., I consider sufficient, taking into account the present cost of labour and the nature of the works, and I do not see how the underbidding, as far as I have been able to look into the matter—for the modified discharging capacity of 320,000 cubic feet of water per minute at Athy, can be carried out for less than £212,000, or probably £250,000."

That ends the Upper Barrow.

"The Lower Barrow.—Much apprehension having been expressed at the local inquiries by Mr. Le Touche, Chairman of the Barrow Navigation Company, and by the owners of mills and of coal and maling stores situate on the Lower Barrow, as to the anticipated injurious effect on their respective properties consequent on water being sent down more rapidly than at present from the upper districts in winter and from an anticipated decrease in the summer flow, I made an excursion of the river from Athy to some distance below Baginbun to judge for myself how far these anticipations of damage were well founded or otherwise.

"As far as I examined the river its channel is in a similar condition to that of the Upper Barrow—it is characterised by

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weirs erected for the purposes of the navigation, insufficient bridges, trees, great masses of aquatic vegetation, and by sludge existing and in course of formation. There are instances too of wharves having been built into the river by private parties, and one instance (at Millfield) of the millowner, for the purpose of enlarging his mill, having extended the building about twenty five feet into the river, and having so permanently blocked up and rendered useless the eastern arch of the bridge carrying the public road over the river there.

"In various parts of the river also, as islands have been formed, they have been planted with osiers, by (as I was informed) the Navigation Company—the result being a rapid enlargement of the obstruction by the silt and debris arrested by the roots and branches of these plants. Two notable instances of this occur at Carlow and at Leighlinbridge."

(At Carlow, you will remember, according to Mr. Molloy's report fifty years ago, there was simply a shoal with rushes growing upon it, but now that is a large island.)

"where large islands so planted with osiers exist in the river immediately above the bridges carrying the public roads over it, greatly lessening the waterway at the river, and of those structures, and causing floods above them to rise to greater heights than otherwise would be the case."

"At Leighlinbridge I was told that a few years ago the river for some distance above the bridge was quite open, so that barges could go directly across from east side to the other; more than the island has extended down stream and is now in actual contact with the bridge, blocking up and rendering almost useless for the passage of water, one of its principal arches."

"The corn and rearing stores at Carlow, Millfield, Leighlinbridge, and Bagninstown, have in all cases been built at low levels, generally speaking, with their lower floors below the level of present highest floods, so that it is occasionally necessary to form small ramparts of silt and earth to keep the water out of the doorways or entrances. At Carlow, however, the stores are at too low a level to admit of this protection being effectual—and as regards level this seems to be the case even in a new rearing store

quite recently built at Leighlinbridge by Messrs. Watson and Butler."

"In most instances below Athy, the flooding of low lands adjacent to the river appears to be caused by the weirs and works of the Navigation Company and the insufficiency of the high drains where the level of the river has been artificially raised."

"The Navigation Company appear by their charter to have the entire monopoly and control of the river, but there does not seem to be in it any obligation to maintain a specified depth of water, or to keep the river free from obstructions, the result being as I have described it; and so long as there remains a waterway in width and depth sufficient for the passage of barges, no trouble seems to be taken to keep the river further open."

"As regards an anticipated increase of flood water, it will be obvious if water were prevented from spreading over the flooded lands, and sent down the river in addition to the maximum quantity its channel is now capable of discharging, that floods at Athy would, to that extent, be increased, and the duration of the flood would be proportionately lessened, and I am of opinion that very heavy floods, lasting in the upper district after the completion of the Drainage Works four or five days, would, no doubt, be increased in volume at Athy by from 80,000 to 100,000 cubic feet of water per minute, which would then be sent into the Lower Barrow as part of a flood, instead of, as now, being passed down in smaller volumes and for a longer period of time in the latter part of a flood or during its subsidence."

"This can be dealt with by removing some of the existing obstructions, lengthening the weirs or placing auxiliary sluices at them, and providing additional waterway at some of the bridges—probably some of them should be taken down and rebuilt; but what the precise remedial measures should be, and their cost, can be ascertained only by careful survey and examination."

"In my judgment the proposed Drainage Works for the relief of the Upper Barrow district will not lessen the summer flow of the river at Athy, and an apprehension in that respect need be entertained."

The Commission at its rising adjourned to a day to be fixed by advertisement, when the last public sitting for the reception of evidence will be held.

Nov. 17, 1885.

-TUESDAY, 17TH NOVEMBER, 1885.

The Commission met at Le Touche's Bank, Castle-street, Dublin.

Present:—Lord CASTLETOWN, Chairman (presiding); The Right Hon. Mr. BRUCE, D.L., Vice-Chairman; Sir JOHN McKERRILL, Colonel GARDEN, D.L., Mr. RICHARD HARRISON, C.B., Mr. HUMPHREY SMITH, and Mr. J. A. CARRERY.

The Secretary, Mr. PENNY, was also in attendance.

Mr. Penny read the following correspondence:—

"Barrow Drainage Committee,

"Carlow, 28th November, 1885.

"Sir,—I beg to acknowledge, with thanks, the receipt of your letter of the 26th instant, enclosing copy of Sir Manning's report on the Lower Barrow. I am directed to forward to you the accompanying copy of a resolution passed at meeting of the Barrow Drainage Committee on to-day, which you will kindly place before your Commission at first opportunity. Mr. James PRIN, Esq., was elected on behalf of this Committee at the meeting of your Commissioners, in Dublin, on the 11th instant or thereabouts, unless prevented by prior engagements. Mr. S. Wilfred HAUGHTON, Treasurer to the Barrow Drainage Committee, will, at their request, be present."

"I am, Sir, your obedient servant,

"JAMES KILICK, Secretary."

"Copy.—No. 125.

"Resolution passed at meeting of the Barrow Drainage Committee, adopted at a public meeting held in Carlow on the 9th of July, 1885, to protect the interests of persons resident in the district of the Lower Barrow:—

"At a meeting of the Barrow Drainage Committee, held at Carlow on the 28th November, 1885, it was proposed by S. Wilfred Haughton, Esq., seconded by Samuel Croftworth, Esq. Resolved—That, with recognising the great value of

drainage of the Upper Barrow, we are anxious to safeguard from injury, whether by floods or droughts, those carrying on their occupations on the borders of the Lower Barrow, and having read Mr. Manning's report thereon. We are of opinion that this can be best effected by (1) the removal of obstructions from, and by enlarging the capacity of the bed of the Lower Barrow; and (2) by controlling the outflow of the water from Cloney bog, and we respectfully, yet earnestly press these views on the attention of the Commissioners, and ask with confidence that, having on previous occasions shown by measurement the insufficient capacity of the Lower Barrow at several places to carry the volume of water estimated by Mr. Manning to be discharged at Athy, that the Commissioners will report to the Lord Lieutenant the danger and injury to be apprehended, if remedial measures be not carried out, of damage by floods in wet weather, and of injury to navigation and trade from insufficient water in dry weather, as well as of injury to the health of the inhabitants of the low-lying districts, who already suffer much from floods and insufficient drainage."

"Signed, P. D. SHAKESPEARE, Chairman."

Lord CASTLETOWN.—As Mr. Manning is here, he will, I dare say, allow the Commissioners to put some questions to him as regards his report.

Mr. PENNY.—Mr. PRIN and Mr. HAUGHTON are both in attendance on behalf of the Barrow Drainage Committee.

Lord CASTLEBROWN.—Well, we shall have Mr. Price and Mr. Haughton here present also, so that they may hear what Mr. Manning has to say, and they may have some questions to put to him.

Mr. Price and Mr. Haughton then entered the room. Lord CASTLEBROWN.—The Commission, Mr. Price, will ask you first to read your statement on behalf of the Barrow Drainage Committee. It may be more

convenient that you should give in that statement first, so that if there are any things in it to which Mr. Manning should reply, he can have an opportunity of doing so when he gives his evidence.

Mr. Price.—I think Mr. Haughton is better prepared to put forward the views of the Barrow Drainage Committee than I am, because he has been more in communication with them.

Nov. 17, 1888.

Mr. R. Wilfred Haughton examined.

Mr. R. Wilfred Haughton.

2507. Lord CASTLEBROWN.—Will you now read what you wish to lay before us, Mr. Haughton?—Yes; the copy of the resolution passed by the Committee has been sent to the Secretary, Mr. Penny, if he will kindly read it.

2508. Lord CASTLEBROWN.—It has been read to the Commission already—kindly proceed?—The observations, my Lord Castlebrown and gentlemen, that I have to make are these. In the evidence given by Mr. Fitzgerald, the Board of Works' Valuator, a gentleman who is a civil engineer, and who is on every ground thoroughly competent—a man of great intelligence. He in his evidence in reply to you, my Lord, gives the following answer. You ask was there any damage done by the neck being too small to let all the water go down—was the damage done below the neck, and he says "the damage was done below that, and the people told me the floods were far and away larger within the last few years than ever they were before." Now that answer applied to Rathangan Drainage, and argumentatively we say that we have every reason to believe that the lake will follow down where we are, and that there would be a greater rush of the upper waters to the lower waters if this scheme is carried out. Mr. Fitzgerald stated that all the property along the Barrow had lost half its value since he first knew it. He said in reply to Mr. Bruen, "I then examined the Upper Rathangan District. There was also a large district going into the Barrow below Monasteran, but both these districts have been drained to the very great detriment of the country below them. The floods are greater than ever they were before. The people are all complaining of it." Well, that is what we all apprehend on the Lower Barrow, though Mr. Manning tells us not to be afraid. Yet here is the Board of Works' own valuator giving that evidence. Then at question 17, the question is put to Mr. Fitzgerald, "Do you think the rainfall has increased of late years," and he says, "Oh, certainly." Dr. McCabe, the Poor Law Inspector, tells us, "I have been in Monasteran when the river was in flood. Monasteran is especially flooded, and of course I have been through the country which crosses by railway from Kildare to Athy. I remember passing through the water on the Great Southern and Western line when the whole country on both sides was an unbroken sheet of water." That has reference to the fact whether Cloney Bog is or is not a reservoir. Mr. Manning says it is an insignificant thing—that it is better to get rid of it. That appears to me to be the drift of his evidence. He says it is insignificant because there are only one or two feet of water over it, and that when it is full it is no reservoir. Now I draw your attention to Dr. McCabe's evidence: "I have been in Monasteran when the river was in flood. Monasteran is especially flooded, and of course I have been through the country which crosses by the railway from Kildare to Athy. I remember passing through the water on the Great Southern and Western line when the whole country on both sides was an unbroken sheet of water. I have seen that, and have had considerable misgivings as to whether we should be able to get through it owing to its depth on the line." Now my query and the query of the Barrow Navigation Company is this—If Mr. Manning's out of 160 by 8½ was in operation previous to this flood, would it have produced no mischief in a navigable

river. In his reply to Mr. Bruen at question 199, he says "it is not the quantity of water which impedes the navigation, but it is the velocity with which the water is sent past the navigation." Well, increased velocity implies increased height and volume. I estimate from the Ordnance maps that the height at the Great Southern and Western line entering Cloney Bog is an or about 218 feet above the datum line. At the aqueduct it is 216. That is at the other side of the bog, so that approximately it is in or about 218 feet. If the Great Southern and Western line was covered to a depth of one foot, according to Dr. McCabe's evidence, we are entitled to assume that at the junction of the Stradally river there would be a depth of twenty-five feet of water instead of two feet. According to the figures on the map, the land near the junction of the Stradally river with the Barrow is marked 193 feet above datum, while 218 is the flood figure, which makes a difference of twenty-five. I don't mean to say that that would be a fair thing to consider for the entire bog, but the flood is a great deal more than two feet—that is my opinion. I have seen the bog in exactly the same state as Dr. McCabe described it. Now Mr. Manning says at 242—"If once during the winter floods you place the Barrow at the level of the Duke's weir, and that the rain commences and floods the valley of the Barrow, all your lands will be flooded. The whole land for 40,000 or 50,000 acres is now flooded to an extent of probably one foot or two feet. When it floods to that extent and another rainfall comes down, and that rainfall is discharged down the Barrow, the only advantage you get in the lower reaches is the effect of the canal filling up of that reservoir of 30,000 acres." Under the conditions stated, I submit that the riparian residents of the lower reaches would be protected by the contracted outlet from the bog through the present river channel at Burt, and which protection Mr. Manning proposes to deprive them of altogether. Mr. Manning says at 245—"you will find if you drain the Barrow you will have higher water in the Barrow often than now. The floods will be equally distributed over the year, and you will not have a maximum flood, probably, much greater than you have at present." My observation upon that is this, that it proves too much, for it goes to prove that the reservoir is no use to a river for either mill power or navigation which is absurd. It is as hazardous for a man like me, in the presence of gentlemen of such experience as any that I put that in my belief. In reply to question 250, we are told by Mr. Manning that the effect of artificial drainage will certainly be to increase the maximum supply in summer, and he adds—"By thorough drainage, especially, we get rid of the sudden floods which are an inconvenience." I ask, why was this not the case with regard to the Rathangan drainage—see Mr. Fitzgerald's evidence, Nos. 16, 22, and 28—like case like rule. The water comes down in a flood there. Then Mr. Manning is asked this question—and it is one I will ask the Commissioners to give their attention to. "Are there not many instances, owing to the water being carried off too soon, where the grass and the land generally surrounding do not get sufficient saturation, have you heard complaints on that subject?" His answer is—"I believe there were complaints about that; but then they thought it was better for them to have a moderate saturation than flooding."

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Mr S. Whitel  
Haughton.

My observation upon that is, that that applies also to Cloney bog and the water meadows bordering it. I don't think that occasional flooding would injure it. I don't want you to take my opinion for more than it is worth on that point. We now come to question 294, in reply to which Mr. Manning says—"I don't think the result of the drainage of 69,000 acres on the Barrow will so increase the water as any time that it would be scientific even to an engineer assuming it. I may state that within the last five years or so, I have put sluices in the Shannon from one end to the other, and the most extraordinary idea was formed when these sluices were put up. We have found that we relieve the land from the ordinary floods, but not from the winter floods. To try to do that we would require contrivances as we do on the Barrow. But these sluices have not changed the practical condition of the Shannon at all. They let off the waters from the reservoirs. When the floods come down they are impounded in the reservoirs for some time, but there is no difference in the quantity of water only that you have not the floods." My observation on that is, why not put up like sluices in the only reservoir of the river Barrow for the like purpose. I submit from that evidence the only logical conclusion is, that that is what should be done. Mr. Brown very properly at the time said—"What you propose to do is to take away anything in the shape of a reservoir that now exists." And Mr. Manning replies—"No doubt you are right in that. There is a great difference between the Shannon and the Barrow, but talking of the flood reservoirs which you have now, I can assure you that the result in the increased quantity of water will not be appreciable at Carlow or farther down the river." Mr. Brown at 235 asks—"The country through which the Barrow flows—that is the country proposed to be relieved of water—is at present something in the shape of an immense mill pond which holds the water in its reservoir and discharges it gradually, is not that so?" Mr. Manning in reply says—"To a certain extent; I have known since this project was put on foot that Mr. Keane who undertook the actual survey of the county, and Mr. Fitzgerald who undertook the actual on way of it were unable to proceed with their work because the lands were flooded up to the month of July." He is asked at 257, how long it takes at present to discharge floods that are cooped up after an ordinary rainfall, and he answers—"I would suppose after a heavy rainfall in the valley of the Barrow above Ashy, a flood might get off in a fortnight or three weeks or longer according to circumstances." He does not commit himself positively to that, as a matter of fact, but gives his opinion. At 258 we find this question—"And the works which are now proposed to be done will enable all that water to be discharged in a few hours." His answer is—"Yes. You see, although the land is flooded, the rainfall is discharged, the only difference being that in the one case it is discharged over the lands, and in the other it is discharged below them. You see not to suppose that because the valley of the Barrow is subject to flood, and under flood for a long time, that there is not a large discharge for these floods right over the land. Now, then, instead of having that discharge over the land, we intend, if this project is successful, to give the discharge under the lands—under the level." My observation upon that previously was that the present choked channel is a protection to the lower river. Lord Castletown, at No. 304, put this question—"Then I may safely assume that, practically, the result in the Barrow from these works would be that you would have an equal flow of water throughout the year." Mr. Manning's answer is—"The works would tend to expose it." Then you ask—"And that there would not be in summer time too small a quantity of water—that it would not be lessened to an appreciable extent." Mr. Manning says—"The summer water would not be lessened—for instance, with regard to the main Barrow at Ashy. The design was to uphold the Duke's weir, and to put a number of sluices in it that you could take down or

put back again." At 306 he is asked—"That, in point of fact, would regulate the upper portion of the Barrow, and serve the reservoir, so to speak." The answer is, "Yes." He is asked—"And by reason of these sluices you would be able to utilize the water." The answer is, "Yes"; and the following question is—"And supposing there was a dry summer, and you trust to the Duke's weir as a reservoir, you would cut off the supply from the lower part." The reply is, "Oh, no, you would never do that. You would keep up a constant level—a constant supply." My observation upon that evidence is this—that the sluices in the Duke's weir could not control the outflow from the bog, the floor of Mr. Manning's new river being 100 feet above the crest of the Duke's weir—see his answer to 2313.

2309. How do you mean could not control the outflow from the bog?—Because of the weir being 100 feet below the floor of Mr. Manning's river.

Mr. Price.—I think that must be a mistake with regard to that answer. I think it must be "below" instead of "above." The answer is—"The Duke's weir is above the bog. I have not the exact figures here as to the height of the top of the Duke's weir, but the bottom of my channel would be 100 feet above the crest of the Duke's weir." I think it must be below.

Mr. Manning.—It is below, certainly. That is one of the objections of allowing an uncorrected proof to be seen by a witness.

Mr. Brown.—Then I would suggest, that being so, that any objections which Mr. Haughton may have founded on that misapprehension had better be omitted.

Mr. Haughton.—I have to apologise for taking up so much of your time. I do not know exactly how to bring my views before you, but I have jotted down certain things here which I am reading to you. If the Duke's weir will control the water in the way our committee suggest, it would answer all purposes, but a fall of 1-3 in the mills. In a cut five miles long would give about a fall of over six feet. I am under the impression that with five feet fall at the Duke's weir, the water would not be held back in the bog as a reservoir, and the top crest of the weir would be about the level of the bottom of the river above the Bert.

2510. Lord Castletown.—I think that is a matter very much for Mr. Manning to give his evidence upon.

2511. Mr. Haughton.—I think, dealing with extreme floods, that two feet is not a sufficient outflow for a winter flood on the bog. I think it is much greater, and at the Stradally river you would have a depth of over twenty feet in deep winter flood over the land at the Junction. I don't know the country well, so as to speak from personal knowledge. I can only speak from the Ordnance map. Mr. Manning's report on the Lower Barrow makes no reference to any special provision required for the reception of an increased supply of water from the drainage of the Upper Barrow. He advises the removal of certain obstructions, such as weeds, and old boats, &c., about which we all agreed, and specifies at Carlow fixed beards on the weir, and also recommends movable ones in place thereof, so to which I am requested and attacked by Mr. Shackleton to say that the boards are not fixed permanently on the weir. They are merely laid on there. They are removable, and are removed at flood tides in a few minutes. I exhibit a photograph of the winter aspect of the weir at Carlow, showing no boards [photograph handed in]. It shows the ordinary aspect of the river when the navigation is not interrupted. The photograph was taken on the last day of February, 1903, for another purpose altogether than for this inquiry. Mr. Manning's report states that at present the river rises at, in wet places, seven feet in floods. He says not a weed as to what would happen if it rose higher. It gives an interesting extract from the late Mr. Bernard Mullins' account

of the Barrow Navigation, and another valuable extract from a treatise on inland navigation, by the late Mr. Mullins, senior, on the inexpediency of continuing rivers, and concludes by adhering to his previously expressed opinion. Mr. Fitzgerald's evidence shows serious floods from the Rathangan drainage, yet Mr. Manning shuts his eyes against the deductions, obvious from the facts stated. His observations on the injury to drainage, and other evils arising from collection of rivers, carry conviction by merely stating them. No organizer of reports for a moment disputes them. But Mr. Manning omits to point out who ought to do what is requisite for the removal of obstructions in the Lower Barrow. Permit me to refer you to the journals of the Irish House of Commons, 31st September, 1708, 1st June, 1709, 10th March, 1723, when the Royal assent was given to a Bill sanctioning an old one of the reign of Henry VIII. It would appear as if there was a legal obstruction standing in the way. On the 13th November, 1758,

the first sum of money—22,000—was granted to the Right Hon. Charles Earl of Drogheda, Sir Richard Butler, Bart., and a number of others, to be applied to removing the obstructions in the navigation of the river Barrow from the tide-water at St. Mullin's to Monasteraven, and a similar grant is made to the same parties, 18th November, 1761. The Irish House of Commons began the mischief of putting dams across the river—that went on for thirty years; and then the Irish House of Commons, after expending large sums of money on the project of navigation of the river, got tired of the subject, and handed the river over to the present Barrow Navigation Company. On the 27th April, 1783, they ordered a committee of the whole House to consider a Bill for the handing over the river and works to the present Company, whose first account was submitted to Parliament, 29th January, 1792. Parliament, who committed the mischief, ought, I humbly submit, to be asked to contribute to remedy the evil.

Nov. 12, 1891.  
Mr. S. W. H. Houghton.

Mr. Manning, &c., re-examined.

Mr. Manning  
&c.

2912. Mr. Price.—I have only a few questions to ask with reference to the Duke's weir. Perhaps Mr. Manning would say how exactly it is to be dealt with—are there to be sluices throughout the whole length of it, or part of it, or is it to be swept away altogether?—I stated in my previous evidence that if the Duke's weir is to be retained there will be sluices in it, the raising of which will be equivalent to its entire removal.

2913. Lord CASTLETOWN.—The raising of the sluices—Yes, that the raising of the sluices will be equivalent to its removal.

2914. At certain periods of course?—Yes—that if the Duke's weir is retained what will occur is this—during floods the sluices will be raised out of the water altogether, so that there will be practically no Duke's weir during floods.

2915. Mr. Price.—You say if the Duke's weir is retained—we wish to know if it is to be retained—not with reference to floods at all, but with reference to keeping up some summer water for the purposes of navigation. According to your answers 307 and 308, it would act as a ponding reservoir if it had sluices in it. I quite admit that when these would be open the result would be just the same as if the Duke's weir had been swept away altogether, but when there is no flood, and the sluices are down, that would certainly have the effect of ponding the water?

2916. Lord CASTLETOWN.—Mr. Manning says when the sluices are down, the water would be ponded above.

Mr. Manning.—Quite so.

Mr. Price.—We want to know if the Duke's weir is to be retained, and are there to be sluices?

Lord CASTLETOWN.—That depends on whether the sluices will be carried out.

2917. Mr. Price.—Is it part of the design that there are to be sluices there capable of holding back some of the water in summer time?

Mr. Manning.—I think you will find it stated in my evidence that that would be a matter for arrangement hereafter—whether the weir should be retained or entirely removed, and the navigation and mill power entirely destroyed—which would be the cheapest—which would be the proper thing to do—a matter upon which I offer no opinion.

2918. Mr. Price.—We would certainly press for the retention of the weir so as to retain some water for the navigation and for mill power during the summer.

2919. Mr. Houghton.—We are anxious to have the reservoir preserved—what we call the reservoir in Cloney bog.

Mr. Price.—At questions 307 and 308 it is clearly laid down—it is not contingent on anything—that the Duke's weir was to be maintained as a reservoir.

2920. Sir JOHN McKEENE.—Is not the Duke's

weir solely kept up for the purpose of supplying power to the mill?

Mr. Houghton.—No, sir, it is a navigation weir, and there is a lock in it for the purpose of navigation. When I was a boy I remember to have seen carts continually coming through there. They passed up to Cloney bog, and brought down turf.

2921. Sir JOHN McKEENE.—The Barrow navigation does not extend beyond Athy?

Mr. Houghton.—It does—there was always navigation up to that bog. Long before the Barrow Navigation Company there was a local navigation over the river. The carts have the right to go up and down through the Duke's weir without paying anything. I think, however, that that traffic is at present probably very little indeed.

2922. Sir JOHN McKEENE.—But the navigation weir proper is upwards of a mile below Athy?

Mr. Houghton.—That is the Barrow Navigation Company's weir.

2923. Sir JOHN McKEENE.—And their navigation extends to Athy, below the mill weir?

Mr. Houghton.—Certainly; you are quite right.

2924. Sir JOHN McKEENE.—But the water is not kept up by the mill weir for the purpose of navigation?

Mr. Houghton.—I think it is.

2925. Sir JOHN McKEENE.—Can you explain that, Mr. Manning? Is the mill weir kept up for the purpose of supplying water for the Barrow Navigation Company?—Certainly not.

Mr. Houghton.—It supplies water for the local traffic—not for the Barrow Navigation Company at all.

2926. Sir JOHN McKEENE.—It has nothing to do with the Barrow navigation at all?

Mr. Houghton.—It has to do with the Barrow navigation, but not with the Barrow Navigation Company.

2927. Sir JOHN McKEENE.—I remember the lock very well. It is merely for carts or small boats.

Mr. Price.—I don't imagine that the owner of the mill there could do away with that weir without doing injury to the public by preventing that cart traffic, which he would have no right to do.

2928. Mr. HARRARD.—Is there any traffic there now in carts, for it appeared to me that the lock had not been used for many years?

Mr. Price.—Oh it is used.

2929. Mr. HARRARD.—The traffic of carts appeared to terminate at the opposite side of the river. The lock appeared never to be used. Any traffic is turf seems to turn into the wharf at the opposite side of the river?

2930. Mr. Price.—We would like it taken down on the notes that the Barrow Navigation Committee desire that the Duke's weir be retained and have

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Mr Manning,  
&c.

slates in it. The sluices would be advantageous in equalising the summer water.

Mr. Haughton.—I would like to have Mr. Manning's answer as to whether the Duke's weir would have the effect of holding up the water in Coney bog.

1931. Mr. Price.—He has stated it would act as a hold up the summer water. I did not conclude that Mr. Manning ever intended to keep these sluices shut during floods. There is one matter about which there has been a great deal of difference of opinion—as to the quantity of water discharged by a river before and after drainage operations have been carried out. I have looked carefully through Mr. Manning's evidence about the river Brosna, and in no place do I find the statement as to the discharge of that river previous to the drainage. Now, all these things are, as a matter of course, recorded at the Board of Works. Before any large drainage operations are carried out it is necessary to state what the river is discharging. I would like to know if any information on that point could be given by Mr. Manning, because a great deal depends upon it. The whole question here seems to be, will the Barrow when drained discharge more water or not. I contend that it will discharge about one-fifth more—that the floods will be increased one-fifth, and that consequent provision should be made for improving the channels to carry off that one-fifth.

1932. Lord CASTLETOWN.—You maintain there will be one-fifth more water coming down; the velocity will be greater?—No, what I maintain is that the maximum floods will be one-fifth more than they are now.

1933. Mr. Haughton.—That is that the maximum flood will be increased about 20 per cent?!

Mr. Price.—Yes, that is the evidence I gave before. If there was any record of the discharge of the Brosna before that river was drained it would at once throw light on this subject, and enable you to come to a definite, clear conclusion. Of course every river before it is drained, or before drainage operations are carried out, has its maximum flood gauged, otherwise you would be working in the dark. I would, therefore, like to ask whether Mr. Manning could give any evidence as to what was the discharge of the Brosna before it was drained—before 1851.

1934. Mr. Manning.—No, nor do I think that such observations have been made in Ireland. Why, in order to obtain the maximum flood of a river in its natural state you should get the discharge for five or probably ten years consecutively, and certainly the Drainage Commissioners did not wait for ten years before they commenced to drain.

\*1934. Lord CASTLETOWN.—I think that is a rash assertion. The Board of Drainage Commissioners waited a great many years to do certain things. I knew a great many drainage works which are not carried out yet, and it was intended to have them carried out 30 years ago. They could have got this information if they wanted it?

Mr. Manning.—But certainly they never did, and I don't think it would be worth much if they had got it.

1935. Mr. Price.—That is a matter of opinion!—Yes. With regard to the quantity of water that would be sent down, I would call the attention of the Commission to Mr. Price's evidence either at Athy or Carlow, where he distinctly stated that in his opinion the maximum quantity flowing down at Athy would not be increased, and upon my observing that that constituted the whole question, he went on with a new argument as to some other effects which would be produced by the drainage.

1936. Mr. Price.—I adhere exactly to what I stated—I believe it won't be increased at Athy, but I said that the tributaries below Athy had time to throw off their floods before the main body of water came down. Looking into the evidence I am confirmed in that, for I think it is stated that it took nineteen days for the flood to come down from the Upper Barrow, and it is said now, I think, that if

this scheme is carried out it will only take ten or twelve hours in future. Therefore I entirely agree with Mr. Manning, as far as that goes—that the discharge at Athy, will be the same; but below Athy, where the rapid tributaries come in—these tributaries will meet the floods of the Upper Barrow and will cause an increase. I have reason to think that there is an existence a public need of the discharge of the Brosna—prepared by Mr. Mulvaney previous to the river being drained.

1937. Lord CASTLETOWN.—Where is it—in the Board of Works?

Mr. Price.—I think so.

1938. Sir JOHN McKEOWN.—Which Mr. Mulvaney do you refer to?

Mr. Price.—The former Commissioner who died a few weeks ago. I would like that in that case and any other that may be brought forward—to know the maximum discharge of floods before and after drainage carried out. In some cases there will not be much difference between them—in other cases there will.

1939. Mr. Haughton.—I recollect you saying in one part of your evidence that the proposed new drainage would not increase the maximum volume of water beyond that mentioned at Athy, but in another place you stated it would be increased by about 20 per cent?

1940. Mr. Price.—Yes—that is further down, and I named the tributaries—the rivers Great, Douglas, and Larr—all very rapid rivers which used formerly to run their floods down before the main flood came down. There is no doubt at all about that.

1941. Mr. Haughton.—Your assumption now is that the floods will meet?

1942. Mr. Price.—My assumption is now that they must meet, because these rivers may be in flood by twenty-four hours or for two days. Formerly it would have been almost impossible for them to meet owing to the length of time it took for the waters to come down from the extensive head of the Barrow district. I have given in my evidence at No. 2578 an account of two channels—one from Bagninawine Ferry and another from Ballygallon Upper or Ballygallon Lower—and I gave the falls per mile and the average dimensions of the rivers. I have drawn this section to show what I meant (produced drawing). The blue section is the existing section of the river—the yellow the section from which Mr. Manning proposes to carry off the floods above Athy. The red would give the section that would be required to discharge the full flood brimming up to the top of the head. Of course that would not be proper drainage—I don't say that the drainage should provide such a channel as would prevent all flooding below; but I think and believe the proposed channel should be increased by one-fifth in order to carry off the increased water.

1943. Lord CASTLETOWN.—Is there anything else you wish to say?

Mr. Price.—I don't think so.

1944. Lord CASTLETOWN.—Grany question you wish to ask Mr. Manning?

Mr. Price.—No.

Mr. Manning's examination resumed

1945. Mr. Manning.—I don't wish to enter into any discussion as to Mr. Haughton's evidence at all. He disagrees in many points with me, and I am satisfied—that is all. But there are one or two exceptions I would wish to allude to. He takes exception to my stating that it was the velocity and not the volume of water that would be injurious to the navigation. That statement was made merely as to the crossing on the Barrow navigation—across the main Barrow river and at a time when I had never seen Carlow at all. It is obvious that if you enlarge the section above the navigation weir you may send a larger quantity of water down with the same velocity. And then with regard to the reservoir which is formed by these lands in the Upper Barrow I would ask Mr. Haughton to consider this—that suppose these lands

were flooded to an average of one foot—that is two feet at the deepest part, and going off to nothing—he will find that the 23,000 acres of land would hold a maximum discharge of 400,000 cubic feet a minute for four days, and I would put it to him whether any such results occur from the flooding of these lands.

2946. Mr. BAKER.—Kindly repeat the figures you have just given?—There are about 23,000 acres of land flooded.

2947. In Clonay bog?—In the whole.

Mr. Broughton.—I would say there would be 123,000 acres if you take in the bog.

2948. Mr. Manning.—I say with 23,000 acres having one foot in depth. Ten acres would hold one minute's supply of maximum flood, and 25,000 acres (that is the flooded land) would hold the supply for forty-two hours. I merely sketched this down—I will give you the exact figures.

2949. Mr. Broughton.—At what depth do you assume it?—At an average depth of one foot.

2950. Mr. Price.—In the first place there seems to be a difference of opinion as to the depth of the flooding which takes place on these lands. Would that flood go over the railway—for there was evidence given by Dr. McCabe that it went over the railway?—Given the insignificant depth of one foot would, as a matter of fact, hold the maximum discharge of 400,000 cubic feet per minute for forty-two hours—my forty-eight hours. Do you think that any man breathing could entirely prevent the whole of this 400,000 cubic feet per minute from going down?

Mr. Price.—Oh, no.

2951. Mr. Broughton.—Mr. Manning's evidence is the most convincing evidence to me of the advantage of Clonay bog as a reservoir. I think his observations support my view. If he breaks down that reservoir by a channel 150 feet wide and 9 feet deep, he will do a great deal of mischief.

2952. Mr. Price.—With regard to a reservoir of that kind we don't say that the whole of the flood is kept up by it, but if it kept back the whole flood for forty-two hours, it would take one-fourth or one-fifth part of the flood for eight or ten days. According to the calculation it would hold up a flood one foot in depth forty-two hours—let us say forty-eight hours—two days. Well, supposing one-fifth of the flood went off sideways into this reservoir, does it not stand to reason that this one-fifth increase of flood which we dread would be kept back for ten days, and the Lower Barrow would be relieved to that extent—according to that calculation. But we dispute the one is stated as to the amount of the flooding. I grant that in ordinary floods, probably a depth of one foot is likely to be the average, but in very excessive floods such as must be apprehended, it might be two feet or more. I am certain that when it came over the railway it must have been over two feet.

2953. Mr. Broughton.—Looking at that flood Dr. McCabe spoke of, I cannot help stating my apprehension, that if it were allowed to escape through the new cut proposed we would be all drowned.

2954. Mr. BAKER.—I wish to take the opportunity of referring Mr. Manning to your answer to a question, in which I put a case before you at the beginning of our sittings, you were good enough to give me a very full reply, indeed. At No. 531 in the evidence, I find the question I put to you on the 29th June, was—"Assuming that one inch and a half of rain has fallen in twenty-four hours throughout the catchment basin in its present unimproved state, and with all the obstructions existing in the river to day, and that it takes 120 hours to run off, and assuming that your works are carried out, and in consequence the one and a half inches of rain in twenty-four hours is run off in twenty hours, will not the result be six times as much water per minute?"

"You say if you accept the assumption the conclusion is a correct one, but that you dispute the correctness or the probability of each from the circumstances which I described." You say—"I am sure the assumptions are not consistent with my experience of such matters. First of

all, you assumed that the falling of an inch and a half of rain in twenty-four hours will run off in twenty hours—that is a complete impossibility—in fact, according to that it would run off quicker than it fell. That could not be so." I wish to protect myself from being misunderstood by saying that I did not suppose that the rain began to run off the instant it fell. You assumed that I did. I imagine that the rain falling in the upper district would take some time to get down to the outfall. What I assumed was simply as an accidental case—not as a practical case—that the flood that came down would run off in twenty-four hours after it had risen to the extent that would enable it to overcome the obstacles that existed, and that probably would not be until many, many hours after the rain had begun to fall. I wish to guard myself from the assumption of having put the ridiculous which you rather put into my mouth—I beg your pardon, I did not put it into your mouth for the question was written. Excuse me, what I said was that I did not think that was what you meant. The question was written by you, and my answer was written, and I assure you I answered as well as I could. I had no desire, I assure you, of putting an absurdity upon you. I only wanted to show that the figures which you put in that question were not practical.

2955. But supposing that I was to alter the figures, and to say that the flood which now takes 120 hours to run off, run off in sixty hours—that would bring it within the limits of possibility, would it not?—I don't know at all. I really could not say.

2956. Your point being that a fall of one and a half inches of rain in twenty-four hours could not run off in twenty hours because it would run off quicker than it fell—putting it at sixty hours it would not run off quicker than it fell?—No.

2957. Then it would come within the range of possibility?—If you assume the data you have taken there—that is that one and a half inches of rain will be running off the catchment under certain circumstances, instead of you having one cubic foot per acre per minute you will have nearly four cubic feet per acre per minute which is impossible.

2958. I am not disputing that—putting the question in the light in which you interpret it no doubt it would be impossible, but I wish to put a question which would bring it within the limits of possibility, in order that you may give your answer to it as a practical question?—Then if you would kindly do as you have done before—put your question in writing and send it to me I will give my answer in writing and send it to you—and let it be taken as if I gave it now.

2959. You say if the discharge of the same quantity of water takes place in one-sixth of the time the quantity of water may be increased in volume?—Of course.

2960. I want to know whether the effect of your works will not be to facilitate the discharge of the waters, and in point of time quicker than very much in comparison with the way they are now discharged?—The effect of the works will be as I have before stated—to give more frequent increase in the volume of the water—it will distribute the water more evenly over the year, but the same quantity of water will come down.

2961. Yes, that is taking the whole year?—Taking the whole year.

2962. But, now, take a single flood?—If you take the maximum flood it will not be increased.

2963. You say then that in a single rainfall, no matter what may be the depth of it, the volume of water at the outfall will not be increased by reason of the drainage works?—In some case, particularly in autumn, there will be a greater discharge frequently than under the present circumstances—frequently.

2964. But not in winter?—Not in winter. I think that the whole result of the drainage will be to let the floods off more gradually, and with less injury to the lands than before.

Nov. 17, 1882.  
Mr. Manning  
c.c.

Nov 27, 1865  
Mr. Manning,  
c.c.

2955. May I ask you, why you draw a distinction between the summer floods and the winter floods when the effect of the drainage works you say may be, and probably will be, to increase the volume at the point of discharge of the summer floods, but not of the winter floods?—Yes.

2956. May I ask you your reason for that?—My reason for that is that in winter, and sometimes even in summer, such as in the month of July, when you hear the stories of the large quantity of water that is over the whole Barrow catchment—when the water comes up to the maximum height on the lands—then the whole flood goes down without being ponded anywhere.

2957. At present, you say I—Yes.

2958. But is not that rather contrary to the evidence of our eyes and the evidence of those who have come before us—that the floods in summer occasionally spread over the whole flat beg at Clancy, and that land we see at each side of the railway?—So they do in a maximum autumn flood—say in August. It is a very difficult question to discuss.

2959. Surely the effect of the rainfall in summer, when the land is dry and is not saturated, will no doubt be first to fill up the land to the point of saturation, and to that extent of course the flood water will not flow over the surface?—To that extent the amount percolated or infiltrated into the soil won't flow over the surface.

2970. But that saturation having been effected, there will be no difference between the flooding in summer and winter?—There would be very little difference between the Lamsme flood and the winter flood, except that the Lamsme flood would not be so great as the winter flood if the same quantity of water had fallen—that is, that the Lamsme flood will not be as heavy as the other, having regard to the quantity of water.

2971. That is owing to the capacity of the soil to take up a portion of the rainfall by saturation?—Yes; and because the flow of the river unimpeded by flood is much less in summer than in winter.

2972. Supposing that saturation had taken place, the summer flood and the winter flood would produce the same effect?—After the whole place had been saturated—after saturation had taken place, it did not matter what time the flood came.

2973. Another question I would like to ask you as to the works not increasing the volume of water at Athy, in your opinion—whether that opinion is founded on the hope that your works will so dry a large portion of the soil and subsoil as to enable the ground to take up a great deal of rainfall by saturation, and so hold it?—The question of infiltration and saturation has nothing to do with the maximum winter flood.

2974. Why not?—Because infiltration has amounted to perfect saturation, and there is no evaporation during the winter flood. Thus it is that mistakes are made by comparing a certain fall of rain with a certain discharge—for instance, one inch of rain, will, say, be discharged, and the immediate consequence of that will be a flood, but in no two districts will the same effects be produced.

2975. It is your opinion that the maximum discharge of water from this district will not be increased by reason of these works which are proposed. I suppose you are aware that in similar cases, theoretically, other engineers don't hold the same opinion?—As in every other profession, there are differences of opinion—and the person acting upon an opinion must take his choice as to the competency of the person giving it.

2976. You say, as a general proposition, that the drainage of the lands of a district does not increase floods?—The drainage sometimes increases the floods at the point of outfall. In nearly every case that you could name I should give different evidence. If you get a very small area and a clean surface to the land, and that you get a more rapid discharge from the surface, you will increase the floods there, but there is a certain point at which the floods will not be increased.

In a large district the different rivers will not come in at the same time, and it will not be due to the rains over the whole country. Every single river or drainage district that you take up has a different rule or law in that respect.

2977. I have seen the evidence of Sir John Hawkshaw, an eminent engineer, who gave his opinion theoretically that drainage does increase floods in the district below the drained district?—Yes, well, Sir John Hawkshaw and I differ if he lays down any such general proposition.

2978. Sir John McKean?—My opinion is that Sir John Hawkshaw's opinion had reference to the effect of thorough drainage—not arterial drainage.

2979. Mr. Burns?—I have remarked that there is a qualification put on the opinions of some of the engineers with regard to thorough drainage, but I don't think Sir John Hawkshaw puts any qualification on his opinion. I have got his evidence here, and I will refer to it. This is what he says—I am reading from his evidence attached to the report of the Select Committee of the House of Lords upon the Conservancy Boards, in 1877. At question 2811 he is asked "There have been witnesses examined before us who have maintained that the system of drainage did not contribute to bring down the water more rapidly, or to a greater degree, than was the case before the drainage was made?—My general answer is that they are mistaken. The opinion I gave as to the William arose upon that special case, but speaking generally, whenever you straighten brooks and cut off their heads, and widen and straighten watercourses, and also when you carry out sub-soil drainage extensively, those operations must cause the water to flow with greater rapidity from the land into the river to which it is carried, and though it may not increase the quantity yet if you bring down the same quantity in one day instead of two days, it doubles the volume, and therefore would be more likely to create floods. I have no doubt there are many works of that sort which increase the magnitude of floods—perhaps immensely, but over a long period of time they do increase them." He there specially mentions the straightening of banks and the widening of watercourses. Perhaps you have seen the report yourself?—Yes; but if you look at the proceedings of the Institute of Civil Engineers the whole question of the Thames has been specially discussed by Mr. Clutterbuck, who was forty years in the Thames—and he had observations to prove—observations of himself and others—and they nearly all agreed—that the drainage did not increase the floods.

2980. Lord Cairnes?—As you are on that point, might I ask do you mean that it does not increase the size of the floods, but that the height of water in the lower district?—When we talk of floods we talk of quantity.

2981. That is, it forces more water on the lower district?—When I talk of a flood I mean the quantity of water discharged in a certain time by that flood.

2982. But the quantity of water is equivalent to the height of the flood. If there is a large flood the quantity of water is higher?—That is, in the upper course.

2983. That is, in the flooded portion of the land?—That is an entirely different question.

2984. But this is what I want to arrive at. If you send down water from the upper drainage district to the lower drainage district, do you consider it would increase the flood on the lower drainage district?—If I send down more water.

2985. If you send down water from the upper drainage district and that the lower drainage district has not been drained. I have got a case in point which I could quote for you?—What I understand you to say is this—that if from the upper district you send down a greater quantity of water—

2986. If you send down the water of that district?—That never went down before.

2987. No portion of which went down before?—That is, in other words, that you increase the quantity.

Nov. 17, 1894  
Mr. Hanning.  
C.R.

1988. No, the same quantity has passed through it—but has passed through the small streams—but if you send it all down by one central river into the lower district which has not been drained?—I really cannot understand.

1989. Mr. HANNING.—Supposing that the water now accumulates in the flooded lands above Monmouth—given at the rate of forty, fifty, or sixty thousand cubic feet per minute—whatever it may be, and that it was prevented from spreading over these lands, and that it passed down the river, in addition to the maximum quantity the present channel is capable of discharging, will not the flood at Ashby be proportionally increased?—I think that having improved the river above you will let that flood off as it comes—that the flooding of the land has nothing to do with it. For once you will have that reservoir filled, but only for once, and then you will have your maximum.

1990. But I say, supposing you should prevent the reservoir from filling, and that you pass the water down the channel instead of allowing it to spread over the land—over which it would spread at the rate of 50,000 cubic feet per minute—instead of permitting it to do that you send that 50,000 cubic feet per minute down in addition to what the channel is capable of discharging?—Yes; no doubt you will increase it. The drainage of these lands will remove the reservoir of the 25,000 acres at whatever depth it is flooded, for once. If in small districts you send down the water rapidly from the upper to the lower district you will have no increase, but what we are doing here is draining the whole district and sending it down at Ashby. That is the point.

1991. Mr. HERRINGTON SMITH.—But you have a great many small districts here all contributing to this at Ashby. I have been reading over the evidence given with reference to those Conservancy Boards, and I think there are thirty or forty engineers stating that the floods had been increased in the lower districts because of the improved drainage in the upper.

1992. Mr. BAKER.—I wish to refer to the last question put by Mr. Hanning, and the answer given to it. You say, "for once you will have that reservoir filled up, but only for once." What do you mean by "for once"?—I mean in that particular flood.

1993. You say for once, but when you exhaust the reservoir the same thing will occur again—it is liable to occur at every flood?—Well, no. If in the present state of the river Burrow you get those lands flooded, and if after some time these lands are freed again from flood—that is, in the nature of a discharge of that flood, the whole quantity of water will be reduced by the quantity of water lying on the lands. If the lands are freed then altogether from the flood and another equal state of circumstances occurred, then that next flood would be increased by that much.

1994. Sir JOHN McKENNAN.—Would not the increase in the river discharge referred to by Mr. Hanning as resulting from the confinement of the flood waters to the channel of the river be met as to prevent any increase in the maximum discharge of the improved channel being brought into earlier action?—Yes; for you would not accumulate the water as you had done before. It would be carried away.

1995. It would be carried away before it could accumulate to the ordinary maximum?—Yes, the flood would be carried away gradually before it would accumulate to the maximum.

1996. Mr. HANNING.—I would wish to refer to the difference of opinion which exists among engineers on the question, and I would call your attention to some of those which have been given in support of the view which Sir John Hawkins stated. I desire to call your attention to the evidence given by Mr. Peel, the present Speaker of the House of Commons, a gentleman who has a great deal of experience on

drainage questions, and who, on examination before the Select Committee of the House of Lords on Conservancy Boards, in answer to question 313—a question relative to this very point—gives a long reply. He is asked as to the cause which led to the increase of floods, and speaking not professionally but merely from his own observation, he says, "I think that floods are certainly of more frequent occurrence of late years, and though the seasons have been very wet, perhaps I should more correctly say that a greater amount of rain has fallen in a given time, whatever may be the quantity that falls throughout the year—grazing all that, and grazing that in December, 1870, in some parts of the country six inches of rain (which is an exceptional fall in one month) fell—grazing all that, and I believe there are causes at work which reduce those periodical inundations, and that when in December an exceptional rainfall takes place it only brings the evil out into more exceptional relief, so to speak. I do not state the cause in the order of the importance of the operation, but I believe one cause may be stated to be the vast increase of sub-soil drainage throughout the country." Then he is asked—"That is not an opinion universally held, you are aware, probably." And his answer is—"I am aware that some eminent engineers, or at least one eminent engineer, has stated a contrary opinion, and I do not for a moment wish to assert with any degradation an opinion against him, except what arises from my own information, and what I have collected from others who I think are of authority on the subject. And, perhaps, it might not be irregular if I were to refer you to a report which was sent to me—the report of transactions of the Institution of Surveyors, for the session 1876-7, where it is stated (I don't know the authority of this particular gentleman whom I am going to refer to, but at all events he states in public in the presence of very eminent individuals who would have corrected him, I imagine, if he had been wrong) that about a fortnight ago he was asked to go down to Wode in Northamptonshire, through which village there runs a small brook which had already overflowed its banks," and he concludes his answer by saying—"If I may pursue that branch of the subject further, Mr. J. Clinton, who is a member of the Institute of Surveyors—and I believe very competent to give an opinion—also alluded in this same debate to which I refer, to thousands of acres over which he used, he says, to shoot snipe for some days after the rain had ceased to fall. He walked, he says, of late years over the same lands even while the rain was actually falling and he found that there was no water that remained on it. The condition which he derives from that is, that it is quite impossible to maintain that such a rapid and complete escape of water could take place without a serious effect on the more rapid increase of the floods, and he could not help thinking that year by year with the increase of under drainage, the floods will also tend to become greater and to rise more rapidly." Now with reference to that illustration isn't it the hoped-for effect of your works that the lands which are now flooded, and on which the water rests for some time, that they will be relieved from water which will run off immediately or nearly immediately, and that it will be nearly a parallel case to that which Mr. Clinton gives?—No. I think I had better state my opinion distinctly, and it is this. "When you improve the surface of the land, say by cutting down timber or removing obstructions to the free passage of water on the surface, all such operations will increase the floods, all thorough drainage or sub-soil drainage will tend to decrease them, and for this very obvious reason, that supposing the whole surface is composed of tin and is perfectly impervious, the whole water falling on that surface will be discharged, but if you put over that tin five or six feet of earth the water will enter that earth if it be a free soil, and will be discharged into the river eventually. I don't think that anyone will say that the water won't take longer to go through

At 21, 1881.  
Mr Manning,  
&c.

these on four feet of soil in order to enter the river course than it would if it were directly off the surface.

2597. That is dealing again with the subject of

2598. We have it that your opinion is perfectly opposed to that of the gentlemen we are here referring to, who hold that draining and embankment tend to increase floods?—I hold the opinion that they will not increase the maximum floods. They will increase the summer discharge, but they will make the discharge on the river more even.

2599. Well I need not proceed further on that point, your divergence of opinion is so manifest!—It is not entirely in the domain of opinion, because we have the fact that in the Brema district the maximum discharge was greater before the lands were completely drained. The largest discharge took place before the drainage of the district was completed.

3000. Mr. HARRARD.—Is that in 1851?—Yes.

3001. Mr. Price.—That is the very point on which we want to get some information. My information with regard to that subject was of the very reverse of what Mr. Manning states.

3002. Mr. Manning.—I have given the whole of this evidence before, and I have stated the number of acres that were drained. In the course of the drainage the greatest discharge was in 1851, which was 267,000 cubic feet a minute.

3003. Mr. HARRARD.—But that was before the drainage?—It was during the drainage—before it was completed. If I remember aright, there were 8,000 acres not yet drained.

3004. Mr. Houghton.—There had been about three-quarters of the work done.

3005. Mr. Manning.—And ever since we have not had anything like that. 200,000 or 220,000 feet per minute is the average.

Mr. Price.—According to one of Mr. Manning's answers there was a flood of 267,000 cubic feet a minute in 1851, before the drainage was completed; but before the drainage I understood the flood was only 133,000 cubic feet. Is that so, Mr. Manning?—I never heard that. I don't know.

Mr. BOWEN.—I understood that an observation had been taken as to the discharge of the river before the drainage.

Mr. Price.—Well I have reason to believe that they have been taken, and that so a result they showed that the discharge has been nearly doubled since the drainage.

3006. Mr. BOWEN.—The illustration which Mr. Manning has referred to with regard to the Brema has no bearing on the question, for he is comparing with an unknown quantity.

3007. Mr. Manning.—What I wish to say is that before the drainage of the Brema district was completed there was a larger quantity of water discharged there than there was in 1851, the works being in progress, but about 8,000 acres still required to be finished.

3008. Mr. HARRARD.—But no thorough drainage had been carried out beyond what existed then?—None.

3009. Have you any record of what the channel of the river Barrow, at a short distance above Athy, is now capable of discharging when the lands immediately adjacent to its banks are flowed to a depth of about three feet?—At the present time I have not. I think it would be very difficult to calculate the discharge of the Barrow now, with irregular sections and an unknown depth. However, I will try it if you give me the question in writing. I will go into it to-morrow.

3010. Mr. BOWEN.—With regard to the Duke's Weir, I would like to ask a question. It is with respect to the reservoir that might be maintained in the Barrow after the works had been completed. Now, if the Duke's Weir were kept up, that reservoir would only be a weir cut in the river, unless the

water overflowed the banks beyond it? That would be all.

3011. And the retention of the Duke's Weir as a means of ponding the water, or for navigation, or for mill purposes below, would be of very small use, would it not?—The Duke's Weir, if maintained as it is now, would probably affect the mills by keeping up their head, but the quantity of additional water ponded would be insignificant.

3012. Mr. Price.—Still it would be something?—No, there would be no pondage beyond the depth at the Duke's Weir at any time.

3013. I thought the channel was to be nine feet below the top?—Yes, but it would be always full.

3014. Mr. Houghton.—Would not that make the bottom of the reservoir be on a line with the crest of the weir?

Mr. Price.—Oh, that is a mistake in the print.

Mr. Houghton.—I don't think it is a mistake.

3015. Lord CASTLEREAGH.—What are the greatest stoppages that you come across in the Upper Barrow?—Bert shall and Monastercavan are the two keys.

3016. Supposing these were removed, what would be the effect generally on the river—would it have a good effect if they were simply removed?—Oh, certainly; it would have a very considerable effect upon the flooded lands open the main Barrow no doubt.

3017. Mr. Smith has suggested that there is an impediment at Garryinch, at Mr. Warburton's place at Portladington?—Oh, yes, between Portladington and Mountlick.

3018. Mr. BOWEN.—There are a good deal of trees on the river there?—Yes, that is a tributary, but I am speaking of the Barrow at Monastercavan only.

3019. Lord CASTLEREAGH.—Well, take a place above Monastercavan—from Monastercavan up to Portladington, first of all, just taking in all obstacles?—The river is nearly altogether shallow. There is a place at Bough beidge where there is the greatest obstruction. It is the highest shallow, and there the river course is still in very crooked.

3020. Supposing these shallows were removed, the effect on the banks of the river would be very great?—Certainly.

3021. Suppose these obstacles were removed, would it be also necessary to remove the obstacles on the Lower Barrow to which you would send down the water?—I may be quite wrong as to the quantity of water going down from Athy, but even if I am wrong, and if there be an increase of water going down from Athy to Carlow, I don't think it will do much injury. The valley of the river is very narrow, and although you may have a few acres flooded to a greater height than before, it will not, to any great extent, injure the lands flooded.

3022. So that practically these obstacles below are not so serious that they would have to be removed, although to improve the place they ought to be removed?—I think that if there is any inconvenience suffered on the lower part of the Barrow—that is, from Athy downwards—that this inconvenience will be increased by allowing the river to revert to its natural state of becoming impeded by obstructions, for there will be continually silt going on. I believe the silt has been going on there from the time the Barrow Navigation commenced.

3023. There is an Act under which the Barrow Navigation are to do something in the shape of clearing?—I was very careful not to put anything into my second report as to the duty of the Barrow Navigation, but there is another thing in regard to the Barrow Navigation which, of course, I do not go into more than the other—that is, that at the time it was formed it was a very important thing for the country, and did good service. At that time the quantity of land flooded or injured was very trifling, and they took their chance of having the navigation. Therefore, I think it would be wrong to put any onerous duties upon those people, to compel them to keep the river clearer than was absolutely necessary.

Jan 31, 1885.  
Mr. Manning,  
Ct.

3024. The obstacles you refer to are the old canal beds, small shoals and islands—could they be removed without any serious expense?—I would like before I give an opinion on that to have some sort of a survey of the Lower Barrow. I really think that if you were to make this particular drainage that it would be well to have some conservancy of the Lower Barrow—some one to keep it in order.

3025. I notice in your proposed scheme you refer especially to the Ovensen river as bringing down a large amount of silt—in point of fact no being the main offender in silting the main Barrow below. Would it be possible to make up some of these silt traps without doing all the other operations on the main river?—Yes.

3026. So as to stop the main offender—the Ovensen—from doing further damage hereafter, and supposing the shoals were removed?—The objection to silt traps is this—that when they are filled you must remove the silt out of the river, otherwise you will have the silt coming down as before. What I would do if I were in charge of the district to-morrow would be to see where the silt was coming from up in the mountains, and I would endeavor to protect the river.

3027. And not make silt traps?—Not make silt traps. I would make steps in the river, and endeavor, by protecting high steep banks in the mountains, to prevent the course of the river being altered.

3028. Mr. BAKER.—I would remind you that there is a good deal of silt coming down from the Upper Barrow as well as from the Ovensen. I have some lead up in the mountains, and the river changes completely from time to time.

3029. Lord CAMERON.—Well, supposing these two chief offenders—the Ovensen and the Upper Barrow—which bring down silt, were both cured by the proposition you make, and that the shoals were cut away, don't you think that would lead in a great degree to the channel in many ways and allow farther drainage to be done?—Any measure of that kind would be good, but it would be difficult to say to what extent it would enable you to drain hereafter. You must really make your main catch, and then you must consider each tributary after that. The despoising of the Barrow, as I before told you, would not of course affect the drainage of the land probably twenty or thirty feet in level above it, and you still would have afterwards the obstructions in the beds of the tributaries.

3030. But the tributary could be drained into the Barrow afterwards?—No.

3031. You think that the main drainage, as proposed by you, is necessary to give an outlet to the tributaries?—Not altogether. There are some portions of the Barrow catchment now which might be drained without at all carrying out this huge scheme; but then you will be doing what you all object to—this is, throwing down the water of the flooded districts more rapidly, and you will increase the floods in the Barrow.

3032. In the Lower Barrow?—In the Upper Barrow and Lower Barrow.

3033. Mr. Price.—Mr. Manning stops at Athy—why does he stop there? The same principle would apply forty-two miles lower down?—Athy is the point of discharge I have taken in my report; and with regard to what you have spoken of about the flood overtaking you, there would be no increase in volume.

3034. There would be an increase in the maximum at Athy, but the maximum only?—You think that floods from the Upper Barrow would be sent down so as to cause the floods from the Lower?

3035. Exactly so?—Well, I have considered that question very well indeed, and I cannot conceive even the possibility of that.

3036. Mr. Price.—It is a matter of absolute observation that the flood used to take sixteen days to come down.

Mr. Manning.—Who said that?

Mr. Price.—I find it in the evidence.

Mr. HAMMON.—No; it is a fortnight I think.

3037. Mr. Manning.—Now I must refer again to this matter. In these discursive conversational references we being constantly made to the flood taking sixteen days or a fortnight, or something of that kind, and we are told it is in the evidence, and sometimes it is stated that it was I said it. Now I was asked to what time the flood would go off, and I said probably a fortnight. Then that was stated to be the velocity with which that flood went down, and I corrected that subsequently in my evidence. I never meant anything of the kind. I meant that after the lands along the Barrow had been flooded that it would probably take a fortnight before the flood had cleared off from the surface of these lands. It was not the flood of the Barrow at all, but that long after the flood had gone down in the Barrow it would take a week or ten days longer to have this go off.

3038. Lord CAMERON.—I believe you have given a statement of the probable cost of this portion of the work?—Yes.

3039. Could you give me any idea of the probable cost of the removal of these shoals?—Certainly; I will take a memorandum of that.

3040. Well, the shoals are at Riverstown, Raylough, Birt, Monasteraven, and Athy?—Very well.\*

3041. Well, I would also like you to give me the probable cost of carrying out your proposition with regard to stopping the silt coming down?—I could not make any statement of that kind without looking at the head of each of those rivers.

3042. Could you give an idea of the probable cost, taking into account the length of the tributaries?—No, I fear not.

Colonel GARDNER.—Would the removal of the shoals and thereby the lowering of the flood water, enable the various towns along the river to be drained?—I did not go into the question of town drainage at all. That is a very serious question.

Lord CAMERON.—I would like to know whether it would be necessary to have a sluice weir at Athy in case these shoals were removed, or would it be more advisable to destroy the Duke's weir?—That would depend on the cost of doing one or the other. I put down in my estimate the full sum for erecting a sluice weir at Athy. If the sluice came and said I will take a certain sum as compensation for the entire removal of the weir, I would see no objection to entertain the proposition. That is a matter altogether for the Commission.

3043. Mr. BAKER.—There was a question I put to Mr. Manning on the subject of partly carrying out his scheme. I think your estimate for deepening the channel of the main Barrow is £214,925?—Yes.

3044. That carries it up to the very source of the river, near Rossmore?—That is the Great Barrow.—Oh, no.

3045. How far does the Great Barrow extend?—Only to Monasteraven. I gave in a return today of what each of these tributaries would cost separately.

3046. A question was asked by Colonel Clenden with reference to the result to the towns along the river if the shoals were removed. I suppose the inhabitants would not then be enabled to drain them for sanitary purposes. I don't know whether Mr. Manning's detailed report will show what will be necessary to carry up the sewers drain as far as Monasterlink?—No. What I was asked for was what would be the cost of the works on the main river, the main river being the Great Barrow from Athy to Monasteraven. That would, in my opinion, cost £214,925, while the Little Barrow, under the influence of the present level of the highest floods of the Great Barrow, would cost £17,659. (Witness pointed out on the map how far this would extend.)

3047. That would be only to Portlannington?—That is all it would go to.

3048. Lord CAMERON.—The question was asked whether that would enable Portlannington to get an outlet for its drainage?—I have never examined Portlannington with regard to its drainage, but if you

\* See Appendix.

See 17, 1812  
Mr. HARRARD  
C.B.

lower the river at Portarlington it will certainly be of great advantage to the inhabitants there if they are suffering from want of drainage.

Mr. BARNES.—Will you give the probable cost of the other portions?—You, Maryborough Heath stream or Killybegs river, £1785; Ballybentham, £146; the Fiddle river to the junction of the Rye river, £14,358; the Pinnery, £2,685; the Strudally river, £856, making a total of £254,031.

Lord CASTLETOWN.—Colonel Carden and Mr. Smith are very anxious if you could give them an estimate from the point where you stop at Portarlington up to Mountsallick?—Very well.

Colonel CARDEN.—By taking away these shoals from Arkly and above the main river would you injure the Lower Barrow?—I have stated that I don't think it would injure it.

3053. Mr. PRICE.—There were some remarks made with regard to navigation, as if it was the navigation rendered the Lower Barrow unfit to carry off the floods. Now if there were no navigation there at all—say, it was swept away—the river would not be sufficient to carry off the floods, because there are long reaches of the river where there is practically no river, and there are other places in the flood-discharging part of the channel in which the velocity is too great to allow any silt to lie there. There is more silt in the lower end of the canal reach, just before you come to the lock, where it has been caught up by the sill water. There is actually no silt, you may say, but there are these islands, weeds, and things of that sort and places, but unless something was done upon a large scale you would not possibly relieve the lands from the extra floods likely to be brought down.

3050. Mr. HARRARD.—I think before the navigation there were one or two places where the river in its natural state could not be capable of discharging more water than goes down now.

Mr. PRICE.—Yes; and the obstruction to the river having been greatly increased by insufficient bridges and matters of that kind.

3051. Mr. HARRARD.—I have a paper here relating

to Lough Erne district. It is Mr. Hawkesley's report. Mr. Price is engaged upon the drainage there, and I have been concerned for a great many landowners in connection with it, so that I am perfectly familiar with the locality. Mr. Hawkesley was sent over by the Government to hold an inquiry at Enniskillen as to the sufficiency of Mr. Price's plans. He had estimated that a little over half a cubic foot per acre per minute—declined six per acre per minute. Mr. Hawkesley in his report states that if the reservoir is taken away that the capacity of the discharge of the out-fall channel should be largely increased, and in fact he made Mr. Price increase it nearly 50 per cent. As it is nearly a parallel case to this, I think it right to mention it.

3052. Sir JOHN McKEILLIE.—You must remember that the ponding capacity of that lake is very great. It appears to be something about seven feet. It is an immense lake. I suppose it is about twenty miles long.

3053. Mr. HARRARD.—Lower Lough Erne is about thirty-two miles.

3054. Sir JOHN McKEILLIE.—Therefore you see that the case is scarcely a parallel.

3055. Mr. HARRARD.—But this refers to the Upper Lake, and it is really not a very dissimilar case to this. This report has reference to the discharge at Enniskillen.

Lord CASTLETOWN.—I don't think that we can get any further evidence to enable us to carry out the orders that we have received.

Mr. BARNES.—It does not occur to me to suggest any further evidence. We have given an opportunity to those on the Lower Barrow to express their views, and we have certainly gone around the district of the Upper Barrow where the works were proposed to be constructed. We have given every opportunity both to the supporters and opponents to express their views, and I don't think we need any more evidence.

Thus closed the public sitting.

# APPENDIX.

## APPENDIX No. 1.

REPORT to the COMMISSIONERS of PUBLIC WORKS, IRELAND, on the DRAINAGE of the LANDS along the RIVER BARROW, and its TRIBUTARIES—By R. MANNING, M. Inst. C.E., Chief Engineer; and Mr. THOMAS FITZGERALD, C.E., on the VALUATION of the FLOODED and INJURED LANDS.

The catchment basin of the River Barrow on its western side is separated from that of the Great Broom by the watershed of the Slievebloom range of mountains, the height of which at the source of the Barrow is 1,571 feet above the level of the sea. From thence the river, which is here called the Glenbarrow River, flows in a north-easterly direction towards the village of Rossmulla, from thence it flows to the north-west to Rathcroffy Bridge, where it is joined by the Glenlahan River; below this point it is joined by the Owenass and Blackwater Rivers, and several minor tributaries; it passes about one mile to the north of Mountmellick below which it receives the waters of the Triogue; then through the town of Portlaurdington to Monasteraven, where it has a catchment of 108,800 acres. A short distance above the latter town it is joined from the north by the Fagle River, which has a catchment of 167,400 acres, the united catchments of both being 276,200 acres.

To the Fagle are tributary the Philipstown, Coshine, and Slane Rivers.

From Monasteraven the Barrow flows in a southerly direction to Athy, having been joined in its course between these towns by the Finny, Killynny, Stradally, and Tringree Rivers and several other streams, the total catchment at Athy being 407,700 acres, or about 487 square miles.

The length of the River Barrow from its source to Athy is 47 miles, and that of the Fagle, from the Glenlahan River to its junction with the Barrow above Monasteraven, is 19 miles.

In this very large district there are only two cases in which arterial drainage works have been executed under the provisions of the Drainage Acts. One on the Slane River, on the upper part of which the Rathangan Drainage District was formed, the other on the Tolly River (a branch of the Finny) called the Kildare District. In the Rathangan District 8,865 acres, and in the Kildare District 2,348 acres were drained or improved.

By Mr. Fitzgerald's recent survey it appears that the quantity of flooded and injured land still requiring improvement within the watershed of the Barrow above Athy is 65,641 acres.

The objects of this Report are—

I. To propose works for effecting this improvement.  
II. To estimate the amount of money necessary to be expended on their execution, and III. To compare that expenditure with the improved value of the lands when drained, as determined by the survey which Mr. Fitzgerald, the valuer, has now completed.

I. The first step towards designing drainage works is obviously a determination of the maximum quantity of water which it is necessary to deal with. The actual quantity of rainfall and of evaporation, long continued observations of which are so necessary and indeed indispensable in correctly estimating the whole quantity of water which a river discharges in the course of the year, give little aid in determining the quantity of water discharged by a great flood.

Forty years ago the Board of Public Works, on consideration of the maximum discharge of some rivers, settled the actual observed discharge of each river, settled the quantity of water to be dealt with in high floods as equivalent to the discharge of half an inch of rain in twenty-four hours off the ground, which is equivalent to 1.25 cubic feet per minute per acre. The numerous

observations made during the execution of the works under the Arterial Drainage Acts showed that, although this rule might be relied on for catchments in the eastern parts of Ireland when they were over 50,000 acres in extent, it was quite insufficient in the great, and that the quantity to be provided for varied with the maximum daily rainfall, with the size, shape, and relative steepness of the catchment, with the height of the watershed, its position in relation to the prevailing winds during rain-storms, and with the proportion of lake surface, &c., &c.

It is more than thirty years ago since I designed the works for two districts in the west of Ireland, in which I estimated the discharge at 1.40 and 2.88 cubic feet per minute per acre, observations on the actual discharge after completion of the works gave 1.59 and 2.43 cubic feet respectively. As the arterial drainage works proceeded discharges were observed varying from 1 to 1.3 cubic feet.

The Shannon at Kiltakee, with 2,560,000 acres of catchment and compensation reservoirs of 50,000 acres (or  $\frac{1}{4}$  part of the entire catchment), has a maximum discharge of 1,600,000 cubic feet per minute, or 0.625 cubic feet per acre.

The River Bann at Toome, immediately below the immense reservoir of Lough Neagh, discharged during the flood of February, 1877, 652,000 cubic feet per minute from a catchment of 1,193,600 acres, or 0.572 cubic feet per acre, the area of the lake being 100,600 acres, or one-twelfth of the entire catchment. On that day the lake rose 4 inches, which represented a discharge of 0.845 cubic feet per acre per minute over the entire catchment, so that but for the compensating power of the lake, the Lower Bann would have had to discharge 1.417 cubic feet per minute per acre.

Mr. John E. Bateman, Past President, Inst. C.E., in a Report made in the year 1832 to the Town Council of Manchester, gave several instances, both in England and Scotland, where the discharge from areas varying in extent and situation amounted to from 10 to 80 cubic feet per acre. From these facts it will appear plain that it is much preferable to base any estimate of discharge on a consideration of observations made in similar cases, when they are available, than to feed them on the quantity of rainfall corrected by the evaporation.

In this case it is satisfactory that a continued series of observations of the discharge of the Great Broom at Fethame, about twenty miles to the westward of the Barrow Bann, have been made during the last thirty years by the late Mr. Kane, who has supplied a set of tables in which the maximum and minimum discharge for each month of every year has been given, as well as a corresponding rainfall observed at Tullamore.

From these it appears that the greatest, mean, and minimum annual rainfalls were 39.90 inches, 27.04 inches, and 14.42 inches; and the greatest rainfall in twenty-four hours was 2.03, which occurred in the month of June, 1877.

The area of the Broom Basin at Fethame is 235,222 acres, and the greatest observed discharge was 267,477 cubic feet per minute, being 0.933 cubic feet, or nearly 1 cubic foot per acre.

On full consideration of all the facts stated, I am of opinion that the greatest flood which may be expected to pass Athy Bridge will never exceed 500,000 cubic feet per minute; and indeed if extraordinary floods,



crossed by lines of navigation at two points, one is at Monasterevan where the Grand Canal is carried by an aqueduct over the river, here there will be no interference whatever with the traffic, the operations being confined to the deepening of the river-channel under the aqueduct, and to any underpinning which may be necessary to the piers and abutments of that structure.

These works do not present any great difficulty but they must be executed with care so as to prevent any settlement of the aqueduct.

About half a mile below Athy a navigation weir has been constructed obliquely across the river for the purpose of connecting the Barrow Navigation with the Athy branch of the Grand Canal, the length of navigation in the river being about 130 yards.

At present in great floods inconvenient to the navigation must arise from two causes—first, the variation in the navigation level in the reach of the canal down to Antrim Lock three quarters of a mile below the weir, and secondly, by the current striking the banks on the broad side when entering the tailbay of the 18th lock of the Grand Canal.

Apprehensions have been expressed that the relief of the lands from flooding will so increase the quantity to be discharged that the navigation in the river-course will become more difficult. These apprehensions are in my opinion groundless. Experience has proved that the ideas formerly entertained of the increased discharge caused by the improvement of such a river as the Barrow, were exaggerated but even if this were not so I beg to observe that injury to navigation proceeds not from the quantity of water discharged, but from the velocity of the current, and this will be less in channels in which improvements have been made by the enlargement of the section and the adjustment of the regimen of the river.

In the present case the navigation will be materially improved by the section of a new weir and sluice (on a more suitable site than the present one) both in respect of the permanence of the navigation level and the velocity in the short distance where the navigation is made in the river.

The following Table gives the necessary particulars under Heads II. and III. of this Report—

TABLE showing the Estimated Cost of the proposed Works, compared with the Valuation of Mr. Pinfen's.

River or Tributary.	Acreage.	Improved Value.		Cost.	
		Gross.	Per cent.	Value.	Per acre.
<b>GRAND BARROW.</b>	1,100	1,100	4 5	514,215	56 1 4
Trillick—					
Flinty River,	5,018	1,012	2 0	25,540	5 0 0
Edinboro,	775	294	0 0	3,860	5 0 10
Deliveries,	504	44	0 0	511	2 0 0
Strathmore,	1,210	210	0 0	1,725	1 15 0
Winnipeg,	410	0	0 0	0	0 0 0
Kyle,	410	0	0 0	127	0 12 10
<b>LEITHE BARROW.</b>	17,944	5,795	4 1	98,187	5 45 0
Trillick—					
Trillick,	1,204	445	0 0	15,771	13 10 10
Ormeau,	1,890	161	0 0	12,610	12 5 5
<b>FOUR BARROW.</b>	5,700	1,710	3 10	55,000	9 10 0
Trillick—					
Ormeau,	5,145	581	0 0	15,310	3 0 0
Slane,	2,550	291	0 0	7,695	3 10 0
Phillipstown,	2,100	740	0 0	15,795	7 10 0
<b>Total.</b>	<b>52,511</b>	<b>10,820</b>	<b>—</b>	<b>474,004</b>	<b>—</b>
Average cost per acre.		£10 11s 3d			

ROB. MANNING, M. INST. C. E.

Office of Public Works, Dublin,  
15th June, 1885.

6969/83.

# BARROW DRAINAGE.

Survey and Valuation Office,  
35 Gardiner's place,  
Dublin, 16th June, 1885.

SIR,—I have completed my valuation of the "Flooded and Injured Lands" of the river Barrow and its tributaries, from Glasahilly and Tinnahinch bridges to the Queen's Quay to the town of Athy in the County of Kildare.

The two classes of lands are delineated on the accompanying Ordnance maps, with books of reference in detail for each county.

The lands are situated in the counties of Kildare and Wicklow, Queen's County and King's County.

The total quantity of flooded and injured land is 45,511a. 0a. 32r.

The present annual value of which I consider to be £18,168 18s 3d.

The probable increase in value I estimate at £10,035 15s 6d.

The distribution between the different counties is as follows:

**County of Kildare.**—In this county there are 16,631a. 2a. 32r. of flooded and injured lands: their present annual value I consider to be £7,137 4s. 1d.; their probable improved annual value I estimate at £3,573 18s. 10d.

Flooded lands contain 6,511a. 0a. 7r.; their present annual value is £3,689 13s 6d.

Their probable increase in annual value is estimated at £3,310 3s 6d.

The injured lands contain 10,120a. 2a. 15r.; their present annual value is £3,847 4s. 7d., and the probable increase in annual value £1,263 15s. 6d.

**County of Wicklow.**—In this county there are only 43a. 3a. 0r. of flooded lands: their present annual value is £20 9s. 7d., and their probable increase will be £20 6s. 6d. The reason of my including this small contingent in the project is that the works, which will benefit George Bog and Glibinstown, in the County of Kildare, will confer a greater benefit on this.

**Queen's County.**—The flooded and injured lands in this county contain 16,076a. 2a. 10r.; their present annual value is £6,832 4s. 3d.; the probable increase I estimate at £3,430 2s. 2d.

The quantity of flooded lands is 8,863a. 1a. 0r.; the present annual value of which is £3,277 12s 9d; the probable increase will be £2,502 19s. 2d.

The injured lands contain 7,185a. 1a. 10r.; their present annual value is £3,174 12s. 3d., and the estimated probable increase £1,137 3s. 0d.

**King's County.**—The flooded and injured lands in this county contain 12,871a. 1a. 0r.; their present annual value is £4,553 0s. 6d.; their increase in annual value I estimate at £2,991 8s. 4d.

The flooded lands are 7,906a. 2a. 0r. in extent: their present annual value is £3,332 3s. 5d., their probable increase in value I estimate at £1,982 13s. 6d.

The injured lands contain 4,965a. 3a. 0r.; their present annual value I consider to be £2,220 17s. 3d., and the probable increase in annual value I estimate at £1,008 8s. 10d.

In all the above valuations I have acted on the supposition that the submerged lands would be permanently relieved from floods, and that the injured lands would be enabled to be thoroughly drained at least four feet in depth.

I am, &c.

(Signed) THOMAS PINFEN.

W. R. Stady, Esq.,  
Secretary, Board of Works.

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## APPENDIX No. 2.

## MR. MAXWELL'S REPORT to the COMMISSIONERS of PUBLIC WORKS in IRELAND on the PRESENT STATE of the RIVER BARROW between the TOWN of ATHY and ST. MULLIN'S.

On the 4th August, 1834, I made a preliminary report to the Board on the drainage of this district in anticipation of the completion of the valuation of the lands proposed to be drained.

Shortly after the receipt of the valuation schedule, I furnished a full report on the 15th June, 1835.

This report dealt only with the drainage of the district above Athy, the works proposed to effect which terminated a short distance below that town.

At the meetings held by the Barrow Commissioners at Athy and Carlow, on the 28th and 29th July last, this report was very fully discussed, and much apprehension was expressed by persons interested in the river between Athy and Ennalskown that the proposed improvements above Athy would so increase the volume of floods, and the rapidity with which they would be discharged, as to cause serious injury to the several interests of navigation, drainage, mill-power, and the malting trade, which were dependent on the state of the river in its lower reaches.

At the request of the Barrow Commissioners I was ordered by the Board to make an inspection of the river from Athy downwards, which I completed on the 28th ultimo, and I now beg leave to submit my report thereon.

The length of that part of the river now under consideration, from Athy to the "Scars" at St. Mullin's, is 48 miles, and has a total fall of 169 feet, which is distributed as follows:—

	Length Miles.	Fall		Discharge	
		Per Mile.	Total	Average Width. Miles.	Area.
From Athy to Carlow.	15	2	30	17	180,507
Carlow to Longhairs bridge.	2½	2½	38	18½	55,818
Longhairs bridge to Ennalskown.	8½	4½	39	14	7,000
Ennalskown to St. Mullin's Falls.	22	2	44	15½	180,641
Total from St. Mullin's Falls to the Board.	1	—	200	2½	1,540
	61		169		

The river between Athy and St. Mullin's lock is canalised for its entire length.

There are 23 locks and 23 weirs, the level at Cloughran lock (2 miles below Carlow) being maintained in the canal (which is about 60 chains in length) by the natural fall in the river for that distance.

An excellent account of this navigation was given by Mr. M. R. Milnes, A.S., in his address as President of the Institution of Civil Engineers of Ireland in the year 1839, which I here insert.

## "River Barrow Navigation.

"The river forms the source of this navigation, except in a few instances where short deviations are made. It extends from Athy, in the county of Kildare, to the tide water below the rocks called the 'Scars,' at St. Mullin's, in the county of Carlow—a distance of 48 miles,\* nearly 5 miles of which are lateral cuts.

"The works were commenced in 1759, according to the design of Mr. Thomas Gray, who proposed to make them suitable for vessels of 70 tons at all seasons, the river in its then state not having been navigable at certain times of the year by vessels carrying more than 2 or 3 tons. Seven locks and the cuts leading to and from them had been completed up to 1799 under the immediate inspection of Mr. John Sangle, a Deputy Engineer.

"In the above mentioned year, £25,500 having been previously spent under the Navigation Board, the Company was incorporated, and Mr. William Chapman was appointed to direct the works.

"The proposal made by the Company to Parliament, was to render the river navigable for boats of 15 tons in summer and 30 tons in winter, with towing-paths for the whole length, and to expend for that purpose £40,000 of their own money, on receiving £20,000 from the public purse; but whatever success might have attended the first proposal it was only partially proceeded with, for during the progress of the works the Company were induced to enlarge their project for the purpose of enabling boats from Youghal and Dungarvan to pass through the River Barrow and Grand Canal to Dublin without transshipping, and also take in coal vessels from British ports. With this view 24 new locks were designed, 80 feet long and 16 feet wide, with 5 feet water on the sills to admit boats of 80 tons burthen. Of these, 10 were built, and 4 of the original locks, of various sizes and of bad construction, were taken down and re-constructed on the modified plan. However, on the withdrawal of the canal bounties on produce carried to Dublin, the progress of the enlarged scheme was stopped, but only for a time, no importance having been apparently attached to the fact that the locks of the Grand Canal, which were not uniform in size, are in no instance more than 70 feet in length, so that Dublin could not be reached by 80-ton boats without transshipping.

"After having expended on the several works, £62,881, including the grant of £20,000, the navigation being still incomplete on the enlarged scale proposed, the Company applied for aid to the Director-General who agreed to give them £25,000 on condition of their reducing the tolls, and to give a further sum of £27,500, a moiety of £55,000, the estimated cost of completing the navigation, with the necessary locks and lateral cuts, weirs, towing paths, &c., on the enlarged scale before specified. These several amounts, together with a sum of £11,630, the half of which was likewise contributed by the Director-General, had been expended on the works up to February, 1812, when a survey was made of their then state, and an estimate of the cost of completion proposed amounting to £46,000.

"The outlay from 1805 to 1812, including £28,291 granted by the Director-General, was £149,501; if to this we add the sum of £25,500 expended by the Board of Navigation previous to the incorporation of the Company, and the sum of £46,000 the amount of the estimate to finish made in 1812, we shall get a total of £220,501, equal to 27,062 8s. 9d. per mile, at a rate of lockage in that distance of only 5 feet per mile, a considerable portion of which would be absorbed in the declassification sufficient to give impetus to the discharges of the waters of the river and of its tributaries.

\* Irish miles.

\*The profits in 1813, according to the report submitted to Parliament were £2,589 or 476 per mile per annum, not including interest on capital subscribed by individuals or on grants obtained from the Government; but had the peculiarly favourable life of the country for a canal the whole way been taken advantage of, the proprietors could not have failed to obtain a far different result, as well by the economy of construction and maintenance as by the general improvement of the surrounding districts, seeing that the Barrow Navigation passes through a country of great natural fertility, and high cultivation, that it meets at its outlet the rivers Ness and Saur by which it communicates with the ports of New Ross and Waterford, and that the towns of Carrick-on-Suir, Clonmel, Kinnatogue, and Thomastown, are also accessible to it, from one extremity, while the port of Dublin is open to its craft at the other; time alone having been necessary for the development of highly remunerative traffic, on a line so favourably circumstanced if cheaply and judiciously constructed. Boats cannot load more than two-thirds of their tonnage in summer.\*

In a treatise on Inland Navigation published in 1823 by Mr. Mullins, senior, a member of a well known firm of contractors in Ireland extensively engaged in the construction of canals, the following observations are made with reference to the Lagan Navigation.

"This Navigation partakes of the defects of its time, both as to design and cost of execution.

"Continuing in the beds of rivers even when running through flat countries lands subjected to floods, is found generally to be inferior to parallel cuts; but in those rivers subject to a sudden rise in their waters, the idea of making them permanently navigable at a remunerative cost is almost hopeless, the tendency they have to raise their beds, the constant shifting of their channels, the wear and casualties to which they are so peculiarly liable, and the consequent cost of maintenance, are considerations of such weight, that if duly appreciated, the improvement of river navigations, except in few instances would not be undertaken."

"These theories," he continues, "applying almost universally are realized in our rivers, which have been rendered partially navigable by an outlay far more than sufficient to make parallel lines of canal through the districts in which they respectively run; the river courses being in the latter cases left free for the performance of such necessary operations as deepening their channels, and the removal of those obstacles which occasion the constant overflowing of their banks for several months in each successive year, to the great detriment, if not destruction, of thousands of acres of what would otherwise be the best land in the country."

On my arrival in Carlow on the 4th ulto, Mr. Mitchell, Secretary to the Barrow Navigation Company, freely placed at my disposal such documents and drawings as he considered would be of use to me in the course of my inspection, and very kindly accompanied me on the following day to my examination of the river from Carlow to Donahedge.

One of these drawings consisted of plans and sections of the entire Navigation made in the year 1813 by Mr. John Molloy, and the other a book of soundings made in the year 1853 by Mr. Mulwary from the Ordnance Survey, with soundings taken from one end of the Navigation to the other.

It appears from Mr. Boyle's [Molloy's] survey that the depth at Athy lock pass bridge, and Athy mills, was 3 to 4 feet, which was proposed to be deepened to 5 feet. Through Ardara Canal from 4 to 7 feet, at Levenstown it was from 3½ to 5 feet, at the junction of the Greese river 3 feet 8 inches to 5 feet, opposite the Lerr river from 3 to 4 feet, with rushes shown in the river; down to Benfield lock the river was from 3 to 8 feet deep, but below the lock there was an accumu-

lation of sand and gravel, over which there was only from 2 to 3 feet of water. At Carlow a shoal is shown above bridge, with 4 feet of water over it, and rushes in river, with depths from 9 to 10 feet.

Down to Cloghmanan mill, there were several shoals, and only 2 feet 6 inches, where a lock was proposed, but afterwards built a short distance above it; and above and below Millford lock were shoals, depth of water 3 feet.

A red hue is drawn about 2 feet above the water surface, which from remarks on the section I take to be a proposition for raising the water, so as with the necessary cuttings of shoals, to have a regular depth of 5 feet.

On Mr. Mulwary's soundings (1853), the depth from Athy bridge to the junction of the Grand Canal is from 3 feet 6 inches to 4 feet, in the Ardara Canal is from 3 feet 10 inches to 5 feet 6 inches; to Levenstown from 3 feet ten inches to 5 feet 9 inches. Down to the junction of the Lerr river the depths were from 3 feet 10 inches to 8 feet 1 inch, and above and below that point shoals are shown in the river. Down to Carlow the least depth shown is 4 feet, at Millford 3 feet 11 inches to 8 feet, an island is shown in the cryg between Mortonsdown and Cloghmanan, and two others between the last named place and Millford; below this there are some shoals with a depth of only 5 feet of water over them, but generally the depths shown are from 4 feet to 4 feet 6 inches.

It must be observed with regard to these two surveys that the soundings were taken on the sailing course of the Navigation, and do not represent the state of the river for its full width. Mr. Mulwary, however, gives a transverse section in the Ballyvaughan Canal, which shows that (more than thirty years ago) it had become filled with mud for more than half its original capacity, he also proposed excavation in the Rathfring and Shillogh canals, and the removal of a shoal immediately below Leighlinbridge.

To enable me to report on the actual state of the part of the river now under review would involve a detailed survey both of the river itself and the land adjoining it, which are subject to floods, this would take a very considerable time, and in my opinion is not necessary at present.

Speaking generally I may say that the state of the lateral canals and of the river itself fully bears out the opinions expressed by Mr. Mullins more than sixty years ago. Such islands and shoals as existed seventy-two years ago still remained and had increased in size; forty years later when Mr. Mulwary made his survey, and in places where Mr. Molloy showed only rocks or rushes in the river, new shoals have been formed.

During my inspection I observed this progress of gradual accretion going on in many instances. I found bullrushes, 6 or 7 feet long, growing in the river, which will no doubt form in each case a nucleus for a new shoal; I also found that the basins and discharging lines of the several weirs were not kept clean, and in one instance at Carlow the river was raised 9 inches by boards permanently fixed on the weir. I also observed at several points on the river the wrecks of old canal boats which undoubtedly cause an increase of the evils already described.

I have been furnished by the Secretary to the Commissioning with a copy of the Charter granted to the Barrow Navigation Company in the year 1790, entitling them to the soil and water of the River Barrow, together with the banks thereof, and such other portions of ground as the Commissioners of Inland Navigation were by any law or usage theretofore entitled.

This Charter makes no provision for the maintenance or conservancy of the river intended in regard to other interests besides those of navigation, nor does it, so far as I can see, place any obligation on the Barrow Navigation Company to execute any works for such purposes.

The Company may therefore demand that no works for the improvement of the river above Athy shall be

undertaken, which may injure their property, and they may maintain that they are not bound in any way to incur the cost of maintaining the river beyond what is necessary for the purposes of navigation. On the other hand the riparian owners may contend that the Navigation Company must use their own property so as not to do injury to their neighbors, and that notwithstanding their Charter they are still bound by the common law maxim "*sic utere tuo ut alienum non laedas*." I am not competent to discuss such questions, nor as an engineer, called upon as I have been to consider all interests without unduly advocating the claim of any one in particular, would it become me to give an opinion one way or the other. I shall, therefore, confine myself to stating my opinion of what should be done to improve the present state of the river-course from Athy downwards—and in the first instance I shall do so on the supposition that no works whatever are to be executed above Athy.

First.—The discharging basin of the weirs should be cleared of obstructions of all kinds, the weirs themselves stanchioned, and the weir basins cleaned out.

Secondly.—The shoals in the river beds should be dredged out, and where they have appeared above water in the shape of islands with offices or other vegetable growth upon them they should be removed, especially where, as at Leightonbridge, they obstruct the free discharge through the bridges.

Thirdly.—The towing paths where they serve as embankments to the lands should be raised to the proper level, and the back drains behind them kept in order.

Fourthly.—At Bagnalstown where the water in the Company's canal is at a high level—only a little below the floor of Mr. Outhwaite's mill, and of some malting floors—aloins should be placed in the navigation weirs, and the canal bank from thence to the mill should be raised and strengthened where necessary.

Fifthly.—At Leightonbridge where the low parts of the town are flooded some extensive malt houses have been recently erected by Mr. Watson, who has taken the precaution of raising the floors from 18 to 24 inches over winter floods. Particular care should be taken in making a complete survey of the river at this place, and works should be undertaken so as to make it of sufficient capacity to discharge floods which for the last thirty years at least have risen 1 foot or more over the ordinary winter level of the river and have done considerable damage, rendering the dispensary, police barracks, and other houses uninhabitable, as stated to me by the dispensary doctor.

Sixthly.—At Corlow scouring sluices should be placed in the weir, the permanently fixed boards should be removed, and should be replaced in the interest of the mill power with movable boards, which could be quickly lowered when not required.

Seventhly.—Some conservancy authority should be created, which would have power to cause the removal of all wrecks of boats and other obstructions to the free discharge of floods.

In the absence of a complete survey I have been unable to do more than to describe in this general way the works which I consider necessary for the improvement of the river. As to the question of the incidence of their cost it is beyond my province and I therefore leave it for the consideration and decision of the Commission.

The physical features of the Lower Barrow are very different from those of the upper district as described in my report of the 15th June last. In the lower district the valley of the river is narrow, the quantity of land flooded is comparatively inconsiderable, the catchment varies in width from  $\frac{1}{2}$  to 17 miles and the fall varies from 2 feet to 8  $\frac{1}{2}$  feet per mile.

Above Athy the average width of the catchment for its whole extent of 907,700 acres is 20 miles, and the fall in the river from Mountaravan to the navigation weir below Athy bridge—a distance of about 16 miles—is 20 feet or 15 inches in the mile. I have described this district in my former report. I have attended the meetings of the Commission on five different occasions, when I was examined by several of its members, and by gentlemen interested in the district. I have listened attentively to the several statements made by those gentlemen and their engineer in support of their views in regard to the several interests mentioned at the beginning of this report, and I have since carefully considered them, so far as my judgment guides me I cannot concur in the apprehensions expressed as to damage being done to the lower district by the execution of the proposed works in the upper one, and I therefore beg leave to adhere to the opinions which I have already expressed, and in which I am confirmed by the examination I have made of the lower district and the facts which I have collected with respect to the discharge of the river, its mill power and navigation.

To enter into a discussion of all the grounds on which my opinion has been founded would oblige me to extend this report to an unreasonable length, and would in fact partake more or less of character of a treatise on artificial drainage, navigation, and mill power.

One of the members of the Commission is an eminent hydraulic engineer to whom I shall be very happy to give any further suggestions in my power if he requires it.

(Signed) ROBERT MANNING, M. Inst. C.E.,  
Chief Engineer.

Office of Public Works, Dublin.  
October 13th, 1885.

#### APPENDIX No. 3.

#### MR. COMMISSIONER HARRARD'S, C.E., REPORT ON THE RIVER BARROW DRAINAGE. THE UPPER BARROW.

The Upper Barrow at Athy carries off the drainage of 408,000 acres, the level of the ground there being about 200 feet above the sea at low water. The channel of the river, for its whole length above Athy is in a lamentable condition, being obstructed by natural shoals and islands, banks of silt and islands in course of formation, great growths of aquatic plants, fallen trees, insufficient bridges, mill and fish weirs, &c. It appears to be daily getting worse, and the bed of the river to be gradually rising, so embankments which have here and there been made at its sides to keep out flood water, and which are stated to have been effected at the time of their construction, are now

periodically submerged; this, however, may to some extent be caused by water from the Rushangan district, consequent on the completion of the drainage works there, being brought down more rapidly than before. Out of the total drainage area of 408,000 acres, 328,000 acres lie below the 400 feet level, most of it, indeed, not attaining to 200 feet—the only elevated land in the district being to the west of Mountaravan, adjacent to the sources of the river Barrow and the Owenagh Stream, where there is an area of about 8,000 acres above the 1,000 feet level, attaining an extreme height of 1,677 feet.

With this exception, the drainage area is an exten-

rive table land, the shallow depressions in which the watercourses occur being separated by flat tracts of bog, and cultivated lands of low elevation and gentle undulations.

The geological formation of the whole basin, excepting the 9,000 acres of elevated land, where the Old Red sandstone appears, is limestone drift, and gravel, of an absorbent nature, covered in parts by flat tracts of peat bog as above mentioned.

It is clear, under these conditions, that rain falling on the surface can find its way, comparatively speaking, but slowly into the streams, and this will still be the case after the enlargement and deepening of the outfall channels.

The catchment basin is divided into upper and lower districts, lying respectively north and south of Monasteraven, where one of the principal obstructions is situate. The lower district has an area of 116,060 acres, or about two-sevenths of the whole, and the streams draining it deliver their waters into the river Barrow about five miles above Athy.

Under ordinary conditions of rainfall, the flood water from this district would for the most part have passed away, before that from the upper district had come down, and it would be only in the case of prolonged rain, or in that of a second flood being caused by a heavy fall of rain occurring at a short interval after a preceding one, that the whole district would be sending down flood water simultaneously.

It was stated in evidence, that maximum flood at Athy, distant only 47, 43, 40, and 38 miles respectively, at the Slieve Bloom Mountains, at Philipstown, at Abbeylough, and at Prosperous, from the most remote sources of the streams, the confluence of which north of Monasteraven forms the river Barrow, does not occur, until about a week after the commencement of the rain, which causes it, and that the accumulated water, due to the flooding of the land above Athy is not discharged in less than a fortnight, or 336 hours subsequently, suggesting that no further rain fall.

These facts coupled with the naturally flat configuration of almost the whole drainage area, and its absorbent nature, indicate that after the completion of the drainage works, water would still continue to flow but slowly off the land into the improved outfall channels, and that the floods from the district would be neither sudden nor violent, but no doubt they would continue rather and be of shorter duration than at present, as the same quantity of water would be sent down past Athy in less time than now occurs.

By Mr. Fitzgerald's report the flooded lands, apart from the saturated lands, have an area of 32,875 acres (about one-eighth of the drainage area), and it was stated in evidence that they are submerged to an average depth of about one foot over the whole area = 996,435,000 cubic feet. This is equivalent to 673, say two-thirds of an inch of rain flowing off the ground from 408,000 acres; but this depth of accumulated water simultaneously with maximum flood at Athy, is not attained until about one week or 168 hours after the commencement of the fall of rain by which it is caused. Under these circumstances, therefore, the water accumulation on the flooded lands at an average rate of 36,855 cubic feet per minute over and above the quantity the river is simultaneously discharging.

Of the above-mentioned 996,435,000 cubic feet of accumulated water, the proposed new and enlarged channels for the Barrow and Eagle rivers, as laid out by Mr. Manning, would contain up to future flood level 185,000,000 cubic feet, or, if calculated for a flood discharge of 320,000 cubic feet per minute at Athy, 156,600,000 cubic feet, leaving 840,435,000 cubic feet of water to be got rid of, and prevented from flowing over the lands. If this had to be carried off in 120 hours, which would in this district after the completion of the Drainage Works, probably be the duration of flood caused by continuous heavy rainfall for two consecutive days, it would be dis-

charged at an average rate of 117,000 cubic feet per minute.

From observations made by me on the ground and the fall of the river, as given by Mr. Manning, it is evident that at Killybeg, about 34 miles above Athy, the river is not capable of carrying off more than about 120,000 cubic feet of water per minute without overflowing its banks, and that when it has risen in heavy flood to a height sufficient to submerge the lands adjacent to its banks to a depth of three feet, it is then discharging about 200,000 cubic feet per minute = 49 cubic feet per acre per minute.

The River Broom Drainage District adjoins that of the Barrow, and is of similar character, consisting of cultivated lands of low elevation and gentle slopes, alternating with flat peat bogs, and at the south-eastern corner of the drainage area there occurs—as in the Barrow basin at its south-western corner and adjoining it—a small district of elevated land in the Slieve Bloom Mountains of the Old Red sandstone formation, 1,500 acres in extent lying above the 1,600 feet level. The two districts compare thus:

Total drainage area Acres	Area of elevated land.	Proportion of elevated land to the whole.
River Broom, 353,333.	7,500 acres.	$\frac{1}{47\frac{1}{2}}$ .
River Barrow, 408,000.	30,000 acres.	$\frac{1}{14}$ .

The Broom District lies to the north-west of the Barrow basin—their mean distance apart being about 22 miles—and the rainfall there is probably somewhat greater than in the Barrow district. I assume it, however, to be the same in both places. It is well known that, under similar conditions, the flood discharges from large districts are less in intensity than from those of smaller areas, and the greatest observed flood discharge in 30 years from the Broom district at Farnham, as given by Mr. Manning, was 267,677 cubic feet per minute, or 932 cubic feet per acre per minute. This occurred on the 7th January, 1851, there having been a rainfall of 48 of an inch on the previous day.

The next greatest flood discharges having been as follows:—

Year	Cubic feet per minute.	Cubic feet per acre per minute.
1859, . . . . .	256,000.	824
1876, . . . . .	300,000.	702
1877, . . . . .	382,000.	806
— . . . . .	212,000.	757

It will be seen from the above returns that, in a period of 30 years after the completion of the arterial drainage works, floods exceeding a discharge of 40 cubic feet per acre per minute occurred three times only, and that on two out of the three occasions the excess was very slight—indeed, in 25 consecutive years—from 1853 to 1877—it may be said not to have been exceeded.

It is remarkable that in June, 1877, a rainfall of 2.00 inches in 24 hours was observed at Tullamore, in the centre of the drainage area, and that this is the greatest recorded fall; but as the flood of 320,000 cubic feet per minute occurred on the 1st of January of that year, this excessive rainfall does not appear to have produced any great flood, and it was probably the result of a local storm.

Although no positive rule or formula, has in this subject been arrived at, I am of opinion, taking into account the geographical position and similar conditions as regards elevation and configuration of both drainage areas, and the circumstance that the Barrow drainage area is 45 per cent. greater in extent than that of the Broom, that the heaviest winter floods in the former will not exceed 60 cubic feet per acre per minute. This will be equivalent to a discharge of about 320,000 cubic feet per minute at Athy.

I consider, therefore, that, if provision is made for this flood discharge at Athy, it will be ample and sufficient to protect the new submerged lands from the various inundations to which they are periodically subject, and from all but those rare and exceptional floods which take place only at widely distant intervals.

of time, which occur in winter, and would then submerge only a small area for a short period, when comparatively little damage accrues, and which, being produced by runfalls of two inches and upwards in 24 hours, it would be economically impossible wholly to control.

No doubt, if the information given, and the flood marks pointed out to me at Athy were correct, there must have passed down the river there, for a short period, during the great flood of September, 1879, something like 500,000 cubic feet of water per minute; but this was caused by the enormous rainfall of 9.49 inches in 24 hours as registered on the 7th at Portlannington (1.65 inches having been registered at Carlow on the same day), preceded on the 6th and succeeded on the 8th by runfalls of .78 and .25 inches respectively.

I am of opinion that the drainage of the Upper Barrow basin cannot be properly carried out without removing the head navigation weir at Athy, and the truck bridge immediately above it; the short reach of the river between Athy and Ardree Locks being destroyed and utilized as part of the navigation. This will entail the construction of a new double-lift lock in lieu of lock No. 25 on the Grand Canal connecting it with the river Barrow, which will greatly facilitate traffic between the two navigations, and steam being substituted for water power at Ardree Mill.

By this arrangement the Duke's weir at Athy may be removed and a new one constructed at three feet lower level; the same fall as now exists being preserved at Mr. Bennett's Mill by lowering the driving machinery and tail race three feet, the removal of the truck bridge and navigation weir allowing this to be done.

But the new weir with its auxiliary sluices will be a costly work and the sluices will require attendance and supervision. Under these circumstances, as this mill as well as Ardree mill, is greatly impeded by back water in winter and suffers from short water in summer, it is a matter for consideration, whether it might not be better to lower the cost of substituting steam for water power in this case also, instead of erecting a new weir and sluices, and lowering the driving machinery and tail race.

Mr. Manning's estimate of £475,654, including the purchase of land and property, compensation, contingencies, and professional and draughtsman's superintendence, &c., I consider insufficient, taking into account the present cost of labour and the nature of the works; and I do not see how the undertaking, as far as I have been able to look into the matter—for the modified discharging capacity of 520,000 cubic feet of water per minute at Athy, can be carried out for less than £525,000, or probably £550,000.

#### The Lower Barrow.

Much apprehension having been expressed at the local inquiries by Mr. L. A. Truiche, Chairman of the Barrow Navigation Company, and by the owners of mills and of corn and malting stores situate on the Lower Barrow, as to the anticipated injurious effect on their respective properties consequent on water being sent down more rapidly than at present from the upper districts in winter and from an anticipated decrease in the summer flow, I made an examination of the river from Athy to some distance below Egnalsdown to judge for myself how far these anticipations of damage were well founded or otherwise.

As far as I examined the river its channel is in a similar condition to that of the Upper Barrow—it is obstructed by weirs and bridges for the purposes of the navigation, meadow bridges, trees, great masses of aquatic vegetation, and by islands existing and in course of formation. There are instances, too, of wharves having been built into the river by private parties, and one instance (at Millfield) of the mill-owner, for the purpose of enlarging his mill, having extended the building about twenty-five feet into the river, and

having so permanently blocked up and rendered useless the eastern side of the bridge carrying the public road over the river there.

In various parts of the river also, as islands have been formed, they have been planted with osiers, by (as I was informed) the Navigation Company—the result being a rapid enlargement of the obstruction by the silt and detritus arrested by the roots and branches of these plants. Two notable instances of this occur at Carlow and at Leighlinbridge, where large islands so planted with osiers exist in the river immediately above the bridges carrying the public roads over it, greatly lessening the waterway of the river, and of these structures, and causing floods above them to rise to greater heights than otherwise would be the case.

At Leighlinbridge I was told that a few years ago the river for some distance above the bridge was quite open, so that barges could go directly across from one side to the other; since then the island has extended down stream and is now in actual contact with the bridge, blocking up and rendering almost useless for the passage of water, one of its principal arteries.

The corn and malting stores at Carlow, Millfield, Leighlinbridge, and Egnalsdown, have in all cases been built at low levels, generally speaking, with their lower floors below the level of present highest floods, so that it is occasionally necessary to form small ramps of sods and earth to keep the water out of the doorways or entrances. At Carlow, however, the stores are at too low a level to admit of this protection being effected—and as regards level this seems to be the case even in a new malting store quite recently built at Leighlinbridge by Messrs. Watson and Butler. In most instances below Athy, the flooding of low lands adjacent to the river appears to be caused by the weirs and works of the Navigation Company and the insufficiency of the back drains where the level of the river has been artificially raised. The Navigation Company appear by their charter to have the entire monopoly and control of the river, but there does not seem to be in it any obligation to maintain a specified depth of water, or to keep the river free from injurious obstructions, the result being as I have described it; and so long as there remains a waterway in width and depth sufficient for the passage of barges, no trouble seems to be taken to keep the river further open.

As regards an anticipated increase of flood water it will be obvious if water were prevented from spreading over the flooded lands, and sent down the river in addition to the maximum quantity its channel is now capable of discharging, that floods at Athy would, to that extent, be increased, and the duration of the flood would be proportionately lessened, and I am of opinion that very heavy floods, being in the upper district after the completion of the Drainage Works four or five days, would, no doubt, be increased in volume at Athy by from 50,000 to 100,000 cubic feet of water per minute, which would then be sent into the Lower Barrow as part of a flood, instead of, as now, being passed down in smaller volume and for a longer period of time in the latter part of a flood or during its subsidence.

This can be dealt with by removing some of the existing obstructions, lengthening the weirs or placing auxiliary sluices at them, and providing additional waterway at some of the bridges—probably some of them should be taken down and rebuilt, but what the precise remedial measures should be, and their cost, can be determined only by careful survey and examination. In my judgment the proposed Drainage Works for the relief of the Upper Barrow district will not lessen the summer flow of the river at Athy, and no apprehension in that respect need be entertained.

RICHARD HARRARD.

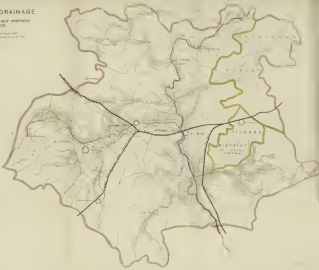
October 28th, 1885.



RIVER BARROW DRAINAGE

GENERAL MAP OF THE DISTRICT PREPARED  
BY THE DISTRICT

Scale 1:50,000  
Barrow is a general outline of the district



## APPENDIX No. 4.

Mr. R. MANNING, C.E.

ESTIMATE of the Cost of the IMPROVEMENT of the MAIN RIVER and its TRIBUTARIES to the points on each (marked upon the plan) at which the back water from the main river meets the independent flow of the tributaries.

	£	s	d.
Gross Barrow from Athy to Monasteran,	224,885	0	0
Leide Barrow under infection of "gross level of highest floods" of Gross Barrow,	17,826	0	0
Maryborough Heath Stream or Killybeg River,	705	0	0
Ballyhennessy Stream,	144	0	0
Fyffe River to junction of State River,	16,808	0	0
Finney River,	2,535	0	0
Stoodally Lane,	876	0	0
	<u>£254,881</u>	<u>0</u>	<u>0</u>

## APPENDIX No. 5.

OFFICE OF PUBLIC WORKS,  
DUBLIN, 12th January, 1886.

## BARROW DRAINAGE.

SIR,  
I beg to forward herewith Estimates for the shoals, which I was requested to do by the Chairman of the Commission.

At the same time I beg to observe that, if the work is to be restricted to an expenditure of, say £20,000, I would of course vary the design so as to give the greatest relief possible, and the cost of the work at the several points named would be very different from that now given.

I am, Sir, your obedient servant,

(Signed,) ROB. MANNING, Chief Engineer.

James S. Penny, Esq., Secretary,  
Barrow Drainage Commission.

## BARROW DRAINAGE.

Estimate for the excavation of the under mentioned Shoals, to the full dimensions given on the Plans and Sections.

	£	s	d.
Cost of Baylough shoal,	4,825	16	0
" Bert shoal,	41,717	0	0
" Monasteran shoal,	14,019	2	0
" Athy shoal,	28,513	8	4
	<u>£88,765</u>	<u>6</u>	<u>4</u>

(Signed,) ROB. MANNING, Chief Engineer.

12th January, 1886.

## APPENDIX No. 6.

SURVEY AND VALUATION OFFICE,  
35, GARDINER'S PLACE, DUBLIN,  
28th January, 1886.

DEAR SIR,

Having completed my examination into the objections made to my Valuation, a list of which you supplied me with, the following is the result of my revision—

COUNTY.	Area of Flooded and Injured Lands.	Present Annual Value.	Probable estimate of Increase in the Annual Value.
	Ac. R. P.	£ s. d.	£ s. d.
Kildare,	16,649 3 37	7,085 11 3	3,886 12 10
Long's,	12,187 3 0	6,445 7 1	3,895 12 11
Queen's,	15,737 0 20	6,983 10 1	3,316 15 6
Wicklow,	47 3 0	26 9 7	20 6 6
✓ Total,	44,522 1 7	17,549 3 11	8,028 27 3

I am, dear Sir, yours faithfully,

(Signed,) THOMAS FREDERICKS.

J. S. Penny, Esq., C.E., Secretary,  
Barrow Drainage Commission.





## APPENDIX No. 7—continued.

## Quaker's Occurr.

Page in Volume of Schedule.	Name of Person Opposing.	Nature of Objections.	Remarks.
8	J. W. Young, for William Young.	Objects to work injured and flooded, and improved value put on Brockley Park and German.	Called on Mr. Young, Sir Allen Walsh, and Captain Cooley, on 19th and 23rd September last, the two former accompanied me over their lands; Mr. Young objects to have any of his lands drained; he has through drained Brockley Park No. 1 (I have struck it out of his Schedule); Nos. 1 and 2 German are liable to floods in time of heavy rain; but he values the sedge which they yield more than any produce they could give if drained; there is a stone wall over near his residence which keeps up an ornamental pond and supplies water to drive the machinery in his forested.
3	Sir Allen Walsh.	Objects to valuation put on townlands Knockplaff, Mon. Farm, Carradale and Lock.	Sir Allen Walsh objects to the valuation put on his lands; I consider the valuation of No. 1 Knockplaff and No. 1 Carradale to be fair; No. 1 Carradale is occasionally flooded; No. 2 has been drained; I have reduced the valuation of it to 1s. per acre for the present; Nos. 1 and 2 Carradale are liable to occasional floods; No. 3 is drained, the outlet is carried by a very cautious route for more than a mile when it drops into the river again; No. 3 is drained into this; I have reduced the valuation of Nos. 1, 2, and 3 as in revised Schedule; Carradale, I consider to be fairly valued; Nos. 3 and 4 in German belong to Sir Allen Walsh; I have altered the Schedule accordingly; those two Nos. 3 and 4 lock are drained by a pipe which passes under the Strathclyde river, and then on by the stream to a stone wall under the Strathclyde river, and No. 4 is injured; this flooding and injury is caused by a stone wall belonging to the Grand Canal Company, which crosses the river at the junction of the Aqueduct at Lock, Carradale and Carradale; Sir Allen Walsh has a stone wall across the River at Carradale; this from an ornamental pond which leads a race to his own and the mill at Carradale; the backwater caused by it affects Sir Allen's lands; the quantity of land affected by these 3 water would not bear a tax in any way sufficient to cover the loss of water power to Mr. Young and Sir Allen Walsh; they do not affect the river up to Carradale.
1, 2, 4, 5	Thomas Traill, for Mrs. Allen, Captain Cooley, and Lord Lonsdale.	Ballydoon and Tinsageput does in Schedule as owned by Captain Cooley, it really belongs to Lord Lonsdale. Since Ballydoon (owned by Lord Lonsdale) is gone to the Bodel. Objects to valuation put on Carradale and Carradale (Mrs. Allen's property) as too high.	The ownership of Ballydoon and Tinsageput is corrected in Schedule, valued Ballydoon on 23rd September last, the quantity of land included is returned in Schedule; it is correct; Carradale is not included in Schedule; I do not consider the estimated amount in value as Carradale to be too high; I estimated it at 200s. On other land.
2	Mr. A. Franks, for Lord Carlisle.	Lands of the Bag put down as owned by Captain Cooley belong to Lord Carlisle. Carradale's property though put down in Schedule as such.	Schedule corrected as to ownership of the Bag and Carradale; My own is not included in Schedule, valued Ballydoon, Carradale, and the Bag; Carradale is in my opinion, in fact, the highest and finest land in the county, and the best in the county; the supply to Captain Cooley is from the Carradale, with the drainage of these lands; I have not yet Strathclyde from the Carradale, it is owned by Lord Lonsdale; there is a present without draining the ornamental pond which is also the supply to the river mill.
—	A. Byrne (agent of R. Wetherston).	States he is put down in Schedule as a tenant to Lord Carradale.	Corrected in Schedule.

Page in Volume Exhibited.	Page in Minutes of Evidence.	Names of Persons Objecting.	Nature of Objections.	Remarks.
8	39	G. Shannon, <i>ex parte</i> Moore.	States Overbanks of Ballynagham and Clonsilla would be little benefited by Drainage.	Examined these townlands on the 21st October, accompanied by Mr. Shannon, there had been heavy and continual rain for the previous day. I had a much better opportunity of judging of the full than my assistant, who visited the land in very dry weather. There appears to be sufficient fall into the Trillick, and consequently I have struck them out of the Schedule. The contents of the lands drained in Schedule was 845, 64, 107, and the estimated increase in value £37 8s. 10d.
5	26	Edward B. S. Smith.	Edwards does not allow to Kinnis, Milnes, portion of land on left hand side of each road, sending into flood-terrace, ought to be expended.	Kinnis belongs to E. R. S. Smith, Esq. I have struck out the part objected to, No. 4 in Schedule, 64, 3s. 0d., annual value £7 14s. 9d., estimated increase £3 1s. 3d.
5	66	Sydney Jennings.	Names of proprietors should be Edwards and McCall, Milnes.	Names corrected.
3	79 and 73	William Drane, tenant of Mrs. Gravena Bellow.	Objects to ascent of land, stated to be flooded and injured in all respects.	Mr. Drane's statement is correct as to his lands being subsoiled, but they suffer from back-water during high water in the Barrow, he should be charged for outfall. I have reduced the estimated increase in value and the amount, as follows:—Corral, 64, 5s. 0d., estimated increase in value £8 5s. 6d. (the canal supply runs through this townland at a higher level than the land); Derrybrook 14, 2s. 6d., estimated increase in value £3 17s. 4d.; Ballynagham 214, 1s. 20d., estimated increase in value £31 15s. 4d. There is no alteration in Fortrose. Total of Mr. Drane's holdings including Fortrose, 433, 1s. 20d., estimated increase £70 14s. 4d.
9	119—120	William Barrall.	States there is an overcharge made to Mackenna.	I examined this townland on the 26th October, accompanied by the tenants, the lands are correctly marked, and the valuations are very moderate; No. 1, right hand side 15 acres. The total will now be 185, 1s. 20d., present value £74 2s. 4d., estimated increase £33 14s. 3d.
No. of Rigs, 8 and 13.	24	Colonel Gordon.		I examined the Trillick Mine on the 26th October, relative to Colonel Gordon's remarks about the canal supply; my valuation was based on the supposition that this supply was to be dealt with so as to enable drainage 4 feet deep to be carried out as the flooded and injured lands south of the weir. If this be impracticable it would not be fair to put an improvement tax on this portion of the district, except on Nos. 1, 3, 6, 7, 8, and part of 9 & 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 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998, 999, 1000.

16th November, 1885.

(Signed),

THOMAS FITZGERALD.

## COUNTY KILDARE.

Page Valuation Schedule.	Persons in Marriage or Births.	Name of Person Objected to.	Nature of Objections.	Remarks.
9	45, 41, 42	Algerine Harvey, for Margins of Drogheda.	Mr. Cassidy is not done as owing Mill Farm; it should be the Margins of Drogheda; objects to valuation of bog.	Stage is Schedule is corrected. I have as ascertained these bogs in company with Mr. O'Shea Johnson, and am confirmed in my opinion that they should be included in the District, and that the rates are moderate; Clonsilla Bog can be drained independent of the Barrow.
9	43, 43, 44	Owen Johnson, for Margins of Drogheda.	Objects to valuation, especially Killybeg, West, and Bicknalltown, Lorrain.	I have examined a second time part of the townlands of Killybeg, West, Bicknalltown, Eder 100, Gashagh, Pellaugh, and Bicknalltown, Lorrain, accompanied by Mr. Owen Johnson, on behalf of the Margins of Drogheda. In Killybeg, West, I have not altered other valuation or contents; in Gashagh, No. 2, I have reduced the "tenant value" from £21 2s 6d to £20 10s 6d, and in Bicknalltown, No. 1, the "estimated increased value" from £1 10s 6d to £1 1s 6d; No. 1, the estimated increased value is reduced from £20 10s 6d to £19 10s 6d; No. 1, Eder 100, from £14 17s 10d to £11 13s 6d; No. 4, Bicknalltown, Lorrain, from £19 6s 8d to £18 0s 6d; Nos. 1 and 2, Bicknalltown, the present value is reduced from £11 0s 6d to £10 15s 3d, and the estimated increased value from £14 10s 6d to £13 11s 3d. I have made an alteration in the value of the bog.
3	48	George W. Marshall.	Status name of Gresham is flooded, objects to valuation.	The tenant on the lands pointed out the extent of the flooded lands, which I believe to be correct. I have reduced the present value £21 0s 6d to £20 17s 8d.
7	54 to 62	William Gillaspie, for Miss Magnan.	Objects to valuation interfering with Miss Magnan's lands.	I visited Miss Magnan's property in company with Mr. Gillaspie; Nos. 1 to 5, Iron Hills is Schedule is done to the advantage of the lands of the Killybeg Drainage District, also Nos. 1 and 2, Eagle Hill, the fall from these has been directed into the Ditch of Lorrain's Drainage, the main channel of which runs by Newry and termination at Cherry Hills, and causes great injury to the lands between this point and the River Barrow; there are 1000, 25, 00, in this district; their present annual value is £50 10s 6d, the estimated increased value £10 2s 6d; it is for the Commissioners to decide if they should be charged for outfall, if so I consider that to be per acre, equal to 40 11s 9d, annual charge would be fair; the outfall of the remainder of Miss Magnan's property flows into the Fenny River at Ballybeg; the flooding of Gillaspie's lands is caused by the outfall under the public road, not being large enough to discharge heavy rainfall, and not by backwater.
9 and 3	62, 66, 67	W. Vaseboyle, for A. N. Vaseboyle.	Amount of bog flooded in Killybeg Drainage is over-stated.	The flooded and injured lands in Killybeg, Lorrain, and Cherry were pointed out to me by John Downan and John Hughes, and are not over-stated. I consider the value which I have placed on the bog and out out bogs to be fair parts of the bog lands opposite the old "peat works" are older than the remainder, but even on these parts the water has to be drained out during wet-weather. My knowledge of these bogs and of Mr. Vaseboyle's property is of longer acquisition than the present enquiry.
9	42 to 64	J. S. Kinsell, for Miss Flanagan.	Objects to area stated to be flooded.	Mr. Kinsell was not able to accompany me on my second inspection of this property, but discussed the rent-charge and the land, Eder and Killybeg, to do so. They agreed to the marking of the bog and flooded lands, the flooding is wholly caused by backwater, and the charge not being of sufficient capacity, the "backwater" being retained for a much longer time than the river flows take to fall.

RECEIVED JULY 1967

Page No. of Exhibit	Name of Person Objecting	Nature of Objections
6	JAMES McILHART,	States he is not the owner of Antigonish; only owns half of Ballyshannon; no part of Yungogawa is now flooded.
7	WILLIAM GAGNON, for Major Berrows.	States he believes the 25A, 2B, described as being flooded is Carrigillil Lower, belongs to Miss Kennedy and not to Major Berrows.
8	THOMAS SOUTH,	Objects to amount set down as being flooded in Fallagee- tion, also to valuation.
9	WILLIAM HOPIES, for Thomas Hoyle, Sgt. Francis Berrows,	Objects to amount set down as injured in Black Hill.
10	ALEXANDER DUNCAN, Tenant of Captain Bodine.	Objects to valuation put on Whitehouse, Tipperoon, Lower, and Upper; states the valuers would not take his property.
11	Mrs. WRIGHT and St. George, for Messrs. Wright and Walsh.	States lands of Upperon, Lower, and Upperon, Upper, and Loweron should be included from amount on account of distance.
12	B. JACKSON, for Major Berrows.	Major Berrows has no land in Carrigillil Lower; he has in Carrigillil Upper; states there is no land flooded in Caberwone, and thinks Major Berrows would object to all his land in schools except Old Court.
13	Messrs. Wright and Walsh.	Messrs. Wright and Walsh are wrongly described as Tylas and Walsh; says very little land is injured or flooded.

THOMAS FITZGERALD.

25th November, 1995.

## APPENDIX No. 8.

## BARROW NAVIGATION COMPANY.

## PARTICULARS OF OBSTRUCTIONS TO TRAFFIC, FOR 10 YEARS ending November, 1885.

Cause of Obstruction.	Date when reported.	Date when removed.	Observations.
Flood.	22 Feb., 1876.	29 Feb., 1876.	No suspension of traffic.
Flood.	11 Dec., 1876.	18 Dec., 1876.	Traffic stopped one week.
Flood.	3 Jan., 1877.	9 Jan., 1877.	Stoves flooded; three boats lying broken at bridge, Carlisle; equal to flood, December, 1872.
Flood.	16 April, 1877.	23 April, 1877.	Boats stopped at Grady.
Flood.	17 Sept., 1877.	24 Sept., 1877.	Traffic delayed.
Flood.	14 Nov., 1877.	3 Dec., 1877.	This flood was reported as rising on 29th October, and appears to have reached its maximum height about 16th November, and reported as falling on 3rd December.
Flood and Ice.	31 Dec., 1877.	21 Jan., 1878.	Floods reported from 10th December to 7th January, 1878, and ice from 14th January to 21st January, 1878. Traffic stopped on 31st December.
Low Water.	6 April, 1878.	13 April, 1878.	Unprecedented; boats aground; attributed to long-continued north winds.
Flood.	18 May, 1878.	25 May, 1878.	Sudden rise of four feet; haulage difficult.
Flood.	15 June, 1878.	25 June, 1878.	Traffic stopped.
Low Water.	3 August, 1878.	10 August, 1878.	Boats aground—carrying over 25 tons.
Ice.	28 Dec., 1878.	16 Jan., 1879.	Traffic stopped.
Flood.	17 Feb., 1879.	24 Feb., 1879.	Traffic much impeded.
Flood.	16 June, 1879.	23 June, 1879.	Traffic stopped.
Flood.	7 Sept., 1879.	22 Sept., 1879.	Traffic stopped.
Ice.	8 Dec., 1879.	15 Dec., 1879.	Traffic stopped.
Flood.	28 Dec., 1880.	4 Jan., 1881.	No suspension.
Ice.	18 Jan., 1881.	23 Jan., 1881.	Traffic stopped.
Flood.	12 Feb., 1881.	17 Feb., 1881.	Traffic stopped.
Flood.	5 Dec., 1881.	12 Dec., 1881.	No suspension.
Flood.	July, 1882.	July, 1882.	No suspension.
Flood.	14 Nov., 1882.	21 Nov., 1882.	No suspension.
Flood.	30 Dec., 1882.	6 Jan., 1883.	No suspension.
Flood.	3 Feb., 1883.	17 Feb., 1883.	Traffic suspended; highest flood since 1875.
Flood.	2 Feb., 1884.	23 Feb., 1884.	—
Low water.	25 June, 1884.	5 Dec., 1884.	Very inconvenient to traffic; boats tonnage averaging thirteen tons.
Flood.	May, 1885.	A few days duration.	No inconvenience to traffic.

(Signed)

R. A. MITCHELL,

CARLOW, 4th December, 1885.